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June 21, 2005

BY OVERNIGHT DELIVERY AND E-FILE

Mary L. Cottrell, Secretary  
Department of Telecommunications and Energy  
One South Station  
Boston, MA 02110

Re: Bay State Gas Company, D.T.E. 05-27

Dear Ms. Cottrell:

Enclosed for filing, on behalf of Bay State Gas Company ("Bay State"), please find Bay State's responses to the following information requests:

From the Attorney General:

AG-6-2	AG-6-7	AG-6-17	AG-6-18	AG-6-19
AG-9-12	AG-9-17	AG-9-18	AG-9-21	AG-9-22
AG-9-24	AG-9-25	AG-9-29	AG-9-30	AG-9-41
AG-9-44	AG-9-45	AG-9-46	AG-9-47	AG-9-53
AG-14-3	AG-14-4	AG-14-5	AG-18-7	

From the Department:

DTE-3-1	DTE-3-5	DTE-3-32	DTE-3-34	DTE-7-1
DTE-7-2	DTE-7-3	DTE-7-6	DTE-7-7	

From the MA Oil Heat Council:

MOC-2-5	MOC-2-6
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Please do not hesitate to telephone me with any questions whatsoever.

Very truly yours,

Patricia M. French

cc: Per Ground Rules Memorandum issued June 13, 2005:

Paul E. Osborne, Assistant Director – Rates and Rev. Requirements Div. (1 copy)

A. John Sullivan, Rates and Rev. Requirements Div. (4 copies)

Andreas Thanos, Assistant Director, Gas Division (1 copy)

Alexander Cochis, Assistant Attorney General (4 copies)

Service List (1 electronic copy)

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
SIXTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-6-2      Has the Company installed any steel mains of any type without cathodic protection after July 31, 1971? If "yes", state the number of feet of such main currently in service, and state all facts that demonstrate that the Company has complied with Title 49, Subpart I, § 192.455 of the Code of Federal Regulation. Produce all orders, decisions, letters, directives and approvals from all federal and state regulatory agencies, including the Department of Telecommunications and Energy, allowing the Company to install steel mains without cathodic protection after July 31, 1971.

Response:      No, to the best of the Company's knowledge, all steel mains installed after July 31, 1971 are cathodically protected in compliance and federal code.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
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D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-6-7      Explain in detail why "Type-3 leaks are typically not reported to the DOT in the annual DOT 7100 system reports" as noted in BSG/DGC-1, p. 10, lines 4-5. Include in this response an explanation of when Type-3 are reported, and copies of any authorities relied upon in making that statement.

Response:    Type-3 leaks are not typically reported to DOT in the annual DOT 7100 system report because in the instructions provided for use in completing DOT 7100 reports under Part E (Number of Known System Leaks at End of Year Scheduled for Repair), the operator is directed to "[i]nclude all known leaks scheduled for elimination by repairing or replacing pipe or some other component." Type-3 leaks are typically very small leaks that are "non-hazardous at the time of detection and can be reasonably expected to remain non-hazardous<sup>1</sup>", therefore presenting no danger to the public. As a result, these leaks are not normally scheduled for repair and thus do not meet the definition of a reportable known leak for DOT 7100 reporting purposes.

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<sup>1</sup> BSG O&M Manual Procedure 14.05 page 2, Leak Classification

COMMONWEALTH OF MASSACHUSETTS  
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RESPONSE OF BAY STATE GAS COMPANY TO THE  
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D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-6-17      By year from 1995 and 2005, state the number of services and feet of  
                         mains that were acquired on credit.

Response:      Bay State does not purchase its mains and services on credit. This  
                         response assumes that the term "on credit" means incurring interest or  
                         carrying costs in transacting the purchase.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
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D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-6-18      By year from 1995 and 2005, state the number of services and feet of main that were acquired for cash.

Response:      All mains and services purchased by the Company were acquired for cash. This response assumes that the term "for cash" means no interest or carrying costs were incurred in transacting the purchase.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
SIXTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-6-19      Produce copies of all correspondence and other documents from the Company's suppliers listed in the response to AG 6-15 that declined to allow the Company to acquire mains or services on credit.

Response:    The Company does not purchase its mains and services on credit (see Bay State's Response to AG-6-17). Therefore, no such correspondence or other documents exist.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-12      Refer to Exhibit BSG/JAF-2, p. 3-266, lines 8-14. Please explain what other methods of allocating the residual rate increase were considered and rejected. Provide all analyses of the alternatives. Include working spreadsheet models of the analyses.

Response:    No other methods of allocating the residual revenue requirement increase were considered. The portion of the revenue requirement in excess of the amount allocated to each rate class using the Allocated Cost of Service study caused by capping each rate class's increase at a 6% cap was allocated to rate classes receiving less than a 6% increase using Department precedent of test year revenues.



COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-17 Please redesign all the proposed residential rates to have a flat, seasonally differentiated volumetric rate. Describe how these rates were developed. Provide all workpapers, calculations and assumptions. Include bill impact analyses (Schedule JAF 2-7) and working spreadsheet models.

Response: Please refer to Attachment AG-9-17a for a revised Schedule JAF-2-1, Attachment AG-9-17b for a revised Schedule JAF-2-5, and Attachment AG-9-17c for the bill impact analyses (Schedule JAF-2-7).

The redesigned rates for all residential customer classes are shown on page 15 of Attachment AG-9-17a. Attachment AG-9-17b was used to recalculate the discounted rates for low-income residential customers.

These residential rates were developed by using the same rate design principles that the Company used in allocating revenue requirement, including the capping of any class revenue increase at 6% until the allocation of the revenue shortfall associated with the residential low income discount rates. The Monthly Customer charges were also kept at the Company's proposed charges.

To design the rates as requested, the Company eliminated the first block surcharge, and used the results of the Accounting Cost of Service Study to split the volumetric revenue requirement between seasons. Note that the resulting flat rates are higher during the summer period than in the winter. This is primarily caused by the shortfall of recovering the customer cost revenue requirement through the monthly Customer Charge and the relatively low volumes in the off-peak period.

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17a  
1 of 16

		Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (41) Med. Annual Low Winter
1	CURRENT BASE RATES											
2	Monthly Customer Charge		\$7.47	\$5.97		\$7.46	\$5.97	\$3.32	\$12.61	\$12.61	\$45.04	\$45.04
3	Winter Volumetric Rates											
4	First Block Rate		\$0.4000	\$0.2247		\$0.4349	\$0.2869		\$0.3694	\$0.3597	\$0.1979	\$0.1708
5	Second Block Rate		\$0.2076	\$0.0709		\$0.3758	\$0.2396		\$0.2315	\$0.2268	\$0.1572	\$0.1315
6	Summer Volumetric Rates											
7	First Block Rate		\$0.2317	\$0.1243		\$0.3848	\$0.2517		\$0.3288	\$0.3240	\$0.1246	\$0.1000
8	Second Block Rate		\$0.1639	\$0.0700		\$0.2965	\$0.1811		\$0.1855	\$0.1884	\$0.0988	\$0.0765
9	Demand Rate											
10	Winter											
11	Summer											
12												
13	First Block Size											
14	Winter		90	90		12	12		125	125	1,000	700
15	Summer		30	30		10	10		35	80	300	500
16												
17	TEST YEAR BILLING DETERMINANTS											
18	Number of Bills											
19	Sales Customers - Annual	2,666,054	2,449,833	216,221	400,456	380,442	20,014	144	190,903	35,847	43,826	15,250
20	Sales Customers - Winter	1,341,210	1,227,579	113,631	194,724	184,413	10,311	72	96,712	18,101	21,670	7,692
21	Sales Customers - Summer	1,324,844	1,222,254	102,590	205,732	196,029	9,703	72	94,191	17,746	22,156	7,558
22												
23	Transportation - Annual	440	440	0	59	59	0	0	9,303	4,061	12,369	5,823
24	Transportation - Winter	223	223	0	29	29	0	0	4,602	2,070	6,291	3,026
25	Transportation - Summer	217	217	0	30	30	0	0	4,701	1,991	6,078	2,797
26												
27	Total - Annual	2,666,494	2,450,273	216,221	400,515	380,501	20,014	144	200,206	39,908	56,195	21,073
28	Total - Winter	1,341,433	1,227,802	113,631	194,753	184,442	10,311	72	101,314	20,171	27,961	10,718
29	Total - Summer	1,325,061	1,222,471	102,590	205,762	196,059	9,703	72	98,892	19,737	28,234	10,355
30												
31	First Block Therms											
32	Sales Customers - Winter	107,074,126	98,497,478	8,576,648	1,687,563	1,604,160	83,403	1,395	8,836,019	1,240,429	17,789,142	4,608,855
33	Sales Customers - Summer	30,311,351	27,899,767	2,411,584	1,464,808	1,389,153	75,655	1,333	1,131,629	736,181	2,742,440	3,120,285
34												
35	Transportation Customers - Winter	18,105	18,105	0	306	306	0	0	505,134	155,589	5,568,728	1,960,146
36	Transportation Customers- Summer	5,269	5,269	0	265	265	0	0	89,954	98,920	1,118,124	1,236,700
37												
38	Total First Block - Winter	107,092,231	98,515,583	8,576,648	1,687,869	1,604,466	83,403	1,395	9,341,153	1,396,018	23,357,870	6,569,001
39	Total First Block- Summer	30,316,620	27,905,036	2,411,584	1,465,073	1,389,418	75,655	1,333	1,221,583	835,101	3,860,564	4,356,985
40												
41	Second Block Therms											
42	Sales Customers - Winter	94,806,098	86,404,748	8,401,350	2,053,651	1,856,385	197,266	0	12,040,801	1,371,743	15,722,941	3,507,671
43	Sales Customers - Summer	15,512,165	13,758,545	1,753,620	1,188,236	1,078,831	109,405	0	1,302,761	1,097,851	2,381,956	2,482,096
44												
45	Transportation Customers - Winter	44,795	44,795	0	721	721	0	0	1,115,993	342,115	7,439,176	2,664,232
46	Transportation Customers- Summer	11,380	11,380	0	616	616	0	0	188,945	201,158	1,398,085	1,789,398
47												
48	Total Second Block - Winter	94,850,893	86,449,543	8,401,350	2,054,372	1,857,106	197,266	0	13,156,794	1,713,858	23,162,117	6,171,903
49	Total Second Block- Summer	15,523,545	13,769,925	1,753,620	1,188,852	1,079,447	109,405	0	1,491,706	1,299,009	3,780,041	4,271,494
50												
51	Total Therms											
52	Total Therms - Annual	247,783,289	226,640,087	21,143,202	6,396,166	5,930,437	465,729	2,728	25,211,236	5,243,986	54,160,592	21,369,383
53	Total Therms - Winter	201,943,124	184,965,126	16,977,998	3,742,241	3,461,572	280,669	1,395	22,497,947	3,109,876	46,519,987	12,740,904
54	Total Therms - Summer	45,840,165	41,674,961	4,165,204	2,653,925	2,468,865	185,060	1,333	2,713,289	2,134,110	7,640,605	8,628,479
55	Peak Day Therms											
56	Total Peak Therms - Winter											
57	Total Peak Therms - Summer											

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17a  
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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
1	<b>CURRENT BASE RATES</b>							
2	Monthly Customer Charge	\$109.37	\$109.37	\$298.53	\$298.53			
3	Winter Volumetric Rates							
4	First Block Rate	\$0.1658	\$0.1638	\$0.0389	\$0.0389			
5	Second Block Rate	\$0.1317	\$0.1288					
6	Summer Volumetric Rates							
7	First Block Rate	\$0.0687	\$0.0712	\$0.0170	\$0.0170			
8	Second Block Rate	\$0.0573	\$0.0569					
9	Demand Rate							
10	Winter			\$1.9787	\$1.9787			
11	Summer			\$0.8723	\$0.8723			
12								
13	First Block Size							
14	Winter	9,000	10,000					
15	Summer	2,200	8,000					
16								
17	<b>TEST YEAR BILLING DETERMINANTS</b>							
18	<b>Number of Bills</b>							
19	Sales Customers - Annual	3,331	1,100	61	91	0		Linked to Revenue File
20	Sales Customers - Winter	1,612	558	32	56	0		line 20 + line 21
21	Sales Customers - Summer	1,719	542	29	35	0		
22								
23	Transportation - Annual	4,101	1,889	120	708	60		line 24 + line 25
24	Transportation - Winter	2,050	972	60	354	30		
25	Transportation - Summer	2,051	917	60	354	30		
26								
27	Total - Annual	7,432	2,989	181	799	60	3,395,996	line 28 + line 29
28	Total - Winter	3,662	1,530	92	410	30	1,702,146	line 20 + line 24
29	Total - Summer	3,770	1,459	89	389	30	1,693,850	line 21 + line 25
30								
31	<b>First Block Therms</b>							
32	Sales Customers - Winter	10,546,755	3,147,730	3,128,697	2,286,988	0		
33	Sales Customers - Summer	1,723,995	2,077,886	1,303,249	867,009	0		
34								
35	Transportation Customers - Winter	14,755,633	7,257,566	4,082,507	26,368,965	68,058,131		
36	Transportation Customers- Summer	2,478,355	5,128,242	953,578	24,699,265	48,156,552		
37								
38	Total First Block - Winter	25,302,388	10,405,296	7,211,204	28,655,953	68,058,131		line 32 + line 35
39	Total First Block- Summer	4,202,350	7,206,128	2,256,827	25,566,274	48,156,552		line 33 + line 36
40								
41	<b>Second Block Therms</b>							
42	Sales Customers - Winter	4,052,965	656,853	0	0	0		
43	Sales Customers - Summer	1,159,973	783,422	0	0	0		
44								
45	Transportation Customers - Winter	7,451,026	3,694,479	0	0	0		
46	Transportation Customers- Summer	1,966,704	2,759,090	0	0	0		
47								
48	Total Second Block - Winter	11,503,991	4,351,332	0	0	0		line 42 + line 45
49	Total Second Block- Summer	3,126,677	3,542,512	0	0	0		line 43 + line 46
50								
51	<b>Total Therms</b>							
52	Total Therms - Annual	44,135,406	25,505,268	9,468,031	54,222,227	116,214,683	609,712,995	line 53 + line 54
53	Total Therms - Winter	36,806,379	14,756,628	7,211,204	28,655,953	68,058,131	446,043,769	line 38 + line 48
54	Total Therms - Summer	7,329,027	10,748,640	2,256,827	25,566,274	48,156,552	163,669,226	line 39 + line 49
55	<b>Peak Day Therms</b>							
56	Total Peak Therms - Winter			342,526	1,388,815			
57	Total Peak Therms - Summer			103,257	1,184,822			

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17a  
3 of 16

line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
58												
59	<b>TEST YEAR REVENUE AND AVERAGE RATES</b>											
60	<b>Base Revenue Proof</b>											
61	Customer Revenue											
62	Winter	\$9,850,058	\$9,171,681	\$678,377	\$1,437,494	\$1,375,937	\$61,557	\$239	\$1,277,570	\$254,356	\$1,259,363	\$482,739
63	Summer	\$9,744,321	\$9,131,858	\$612,462	\$1,520,527	\$1,462,600	\$57,927	\$239	\$1,247,028	\$248,884	\$1,271,659	\$466,389
64	Volumetric Revenue - First Block											
65	Winter	\$41,333,406	\$39,406,233	\$1,927,173	\$721,711	\$697,782	\$23,928	\$0	\$3,450,622	\$502,148	\$4,622,522	\$1,121,985
66	Summer	\$6,765,357	\$6,465,597	\$299,760	\$553,690	\$534,648	\$19,042	\$0	\$401,656	\$270,573	\$481,026	\$435,699
67	Volumetric Revenue - Second Block											
68	Winter	\$18,542,581	\$17,946,925	\$595,656	\$745,165	\$697,900	\$47,265	\$0	\$3,045,798	\$388,703	\$3,641,085	\$811,605
69	Summer	\$2,379,644	\$2,256,891	\$122,753	\$339,869	\$320,056	\$19,813	\$0	\$276,711	\$244,733	\$373,468	\$326,769
70	Demand Revenue											
71	Winter											
72	Summer											
73	Total Base Revenue											
74	Annual	\$88,615,366	\$84,379,185	\$4,236,181	\$5,318,457	\$5,088,924	\$229,532	\$478	\$9,699,385	\$1,909,397	\$11,649,124	\$3,645,186
75	Winter	\$69,726,045	\$66,524,839	\$3,201,206	\$2,904,370	\$2,771,620	\$132,750	\$239	\$7,773,989	\$1,145,207	\$9,522,971	\$2,416,329
76	Summer	\$18,889,322	\$17,854,346	\$1,034,976	\$2,414,087	\$2,317,304	\$96,783	\$239	\$1,925,396	\$764,190	\$2,126,154	\$1,228,857
77												
78	<b>Test Year Revenues Other Than Base</b>											
79	Direct Gas Adjustment Factor											
80	Winter	\$174,520,722	\$159,967,958	\$14,552,764	\$2,954,414	\$2,734,150	\$220,264	\$1,046	\$18,045,768	\$2,077,451	\$27,427,776	\$6,173,431
81	Summer	\$37,128,614	\$33,832,934	\$3,295,680	\$2,083,413	\$1,941,005	\$142,408	\$1,020	\$2,072,310	\$1,426,365	\$4,348,236	\$4,371,925
82	Indirect Gas Adjustment Factor											
83	Winter	\$10,654,378	\$9,770,054	\$884,324	\$140,140	\$129,799	\$10,341	\$46	\$1,042,083	\$119,382	\$1,627,923	\$320,877
84	Summer	\$2,625,689	\$2,387,022	\$238,667	\$153,346	\$142,650	\$10,696	\$79	\$136,326	\$106,741	\$299,777	\$329,979
85	Distribution Adjustment Factor											
86	Winter	\$2,770,292	\$2,543,322	\$226,970	\$20,423	\$19,096	\$1,327	\$2	\$264,368	\$37,414	\$549,519	\$157,285
87	Summer	\$715,107	\$650,130	\$64,977	\$32,908	\$30,614	\$2,294	\$6	\$55,351	\$43,536	\$155,868	\$176,021
88												
89	<b>Test Year Average Rates</b>											
90	Direct Gas Adjustment Factor											
91	Winter		\$0.8645	\$0.8645		\$0.7897	\$0.7897	\$0.7498	\$0.8644	\$0.7953	\$0.8184	\$0.7606
92	Summer		\$0.8103	\$0.8103		\$0.7853	\$0.7853	\$0.7652	\$0.8513	\$0.7777	\$0.8485	\$0.7804
93	Indirect Gas Adjustment Factor											
94	Winter		\$0.0528	\$0.0528		\$0.0375	\$0.0375	\$0.0330	\$0.0499	\$0.0457	\$0.0486	\$0.0395
95	Summer		\$0.0573	\$0.0573		\$0.0578	\$0.0578	\$0.0593	\$0.0560	\$0.0582	\$0.0585	\$0.0589
96	Distribution Adjustment Factor											
97	Winter		\$0.0137	\$0.0137		\$0.0055	\$0.0055	\$0.0014	\$0.0119	\$0.0119	\$0.0119	\$0.0119
98	Summer		\$0.0156	\$0.0156		\$0.0124	\$0.0124	\$0.0045	\$0.0204	\$0.0204	\$0.0204	\$0.0204
99	Deferred Gas Cost Factor											
100	Winter		\$0.0467	\$0.0467		\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467
101	Summer		\$0.0467	\$0.0467		\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467
102												
103	<b>Imputed Gas Costs for Trans. Cust. (TY)</b>											
104	Direct Gas Adjustment Factor											
105	Winter	\$57,311	\$57,311	\$0	\$859	\$859	\$0	\$0	\$1,476,953	\$419,052	\$11,253,365	\$3,733,137
106	Summer	\$14,267	\$14,267	\$0	\$733	\$733	\$0	\$0	\$250,434	\$247,382	\$2,252,534	\$2,502,711
107	Indirect Gas Adjustment Factor											
108	Winter	\$3,320	\$3,320	\$0	\$38	\$38	\$0	\$0	\$80,920	\$22,746	\$631,887	\$182,819
109	Summer	\$954	\$954	\$0	\$51	\$51	\$0	\$0	\$15,618	\$17,465	\$147,198	\$178,237

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17a  
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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
58								
59	<b><u>TEST YEAR REVENUE AND AVERAGE RATES</u></b>							
60	<b><u>Base Revenue Proof</u></b>							
61	Customer Revenue							
62	Winter	\$400,513	\$167,336	\$27,465	\$122,397	\$1,673,238		line 2 * line 28
63	Summer	\$412,325	\$159,571	\$26,569	\$116,128	\$1,700,847		line 2 * line 29
64	Volumetric Revenue - First Block							
65	Winter	\$4,195,136	\$1,704,387	\$280,516	\$1,114,717	\$73,688		line 4 * line 38
66	Summer	\$288,701	\$513,076	\$38,366	\$434,627	\$54,492		line 7 * line 39
67	Volumetric Revenue - Second Block							
68	Winter	\$1,515,076	\$560,452					line 5 * line 48
69	Summer	\$179,159	\$201,569					line 8 * line 49
70	Demand Revenue							
71	Winter			\$677,756	\$2,748,048	\$0		line 10 * line 57
72	Summer			\$90,071	\$1,033,520	\$0		line 11 * line 58
73	Total Base Revenue							
74	Annual	\$6,990,909	\$3,306,391	\$1,140,743	\$5,569,437	\$3,502,265	\$141,347,140	line 75 + line 76
75	Winter	\$6,110,724	\$2,432,175	\$985,737	\$3,985,162	\$1,746,926	\$108,749,875	line 62 + line 65 + line 68 + line 71
76	Summer	\$880,185	\$874,216	\$155,006	\$1,584,275	\$1,755,339	\$32,597,265	line 63 + line 66 + line 69 + line 72
77								
78	<b><u>Test Year Revenues Other Than Base</u></b>							
79	Direct Gas Adjustment Factor						\$307,478,651	
80	Winter	\$11,386,539	\$2,931,479	\$2,283,880	\$1,820,147		\$249,622,653	
81	Summer	\$2,406,876	\$2,249,653	\$1,097,293	\$670,293		\$57,855,998	
82	Indirect Gas Adjustment Factor							
83	Winter	\$701,197	\$150,322	\$143,101	\$98,211		\$14,997,660	
84	Summer	\$172,174	\$176,541	\$77,805	\$53,494		\$4,131,951	
85	Distribution Adjustment Factor							
86	Winter	\$434,212	\$182,500	\$79,946	\$351,731		\$4,847,692	
87	Summer	\$149,511	\$219,272	\$46,039	\$521,551		\$2,115,170	
88								
89	<b><u>Test Year Average Rates</u></b>							
90	Direct Gas Adjustment Factor							Some classes are combined.
91	Winter	\$0.7711	\$0.7800	\$0.7711	\$0.7800			line 80 / (line 32 + line 42)
92	Summer	\$0.8369	\$0.7832	\$0.8369	\$0.7832			line 81 / (line 33 + line 43)
93	Indirect Gas Adjustment Factor							
94	Winter	\$0.0476	\$0.0408	\$0.0476	\$0.0408			line 83 / (line 32 + line 42)
95	Summer	\$0.0833	\$0.0682	\$0.0833	\$0.0682			line 84 / (line 33 + line 43)
96	Distribution Adjustment Factor							
97	Winter	\$0.0119	\$0.0119	\$0.0119	\$0.0119			line 86 / line 53
98	Summer	\$0.0204	\$0.0204	\$0.0204	\$0.0204			line 87 / line 54
99	Deferred Gas Cost Factor							
100	Winter	\$0.0467	\$0.0467	\$0.0467	\$0.0467			INPUT from COS
101	Summer	\$0.0467	\$0.0467	\$0.0467	\$0.0467			INPUT from COS
102								
103	<b><u>Imputed Gas Costs for Trans. Cust. (TY)</u></b>							Calculated using average rates and
104	Direct Gas Adjustment Factor							transportation volumes.
105	Winter	\$18,160,054	\$9,054,121	\$3,338,573	\$21,799,382		\$69,292,806	(line 91 + line 100) * (line 35 + line 45)
106	Summer	\$3,927,415	\$6,545,332	\$842,530	\$20,496,779		\$37,080,117	(line 92 + line 101) * (line 36 + line 46)
107	Indirect Gas Adjustment Factor							
108	Winter	\$1,057,570	\$446,838	\$194,425	\$1,075,840		\$3,696,404	line 94 * (line 35 + line 45)
109	Summer	\$370,188	\$538,074	\$79,415	\$1,684,985		\$3,032,185	line 95 * (line 36 + line 46)

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
110												
111	<b><u>Summary of TY Rev. w/ Imputed Gas Costs</u></b>											
112	Test Year Base Revenue											
113	Annual	\$88,615,366	\$84,379,185	\$4,236,181	\$5,318,457	\$5,088,924	\$229,532	\$478	\$9,699,385	\$1,909,397	\$11,649,124	\$3,645,186
114	Winter	\$69,726,045	\$66,524,839	\$3,201,206	\$2,904,370	\$2,771,620	\$132,750	\$239	\$7,773,989	\$1,145,207	\$9,522,971	\$2,416,329
115	Summer	\$18,889,322	\$17,854,346	\$1,034,976	\$2,414,087	\$2,317,304	\$96,783	\$239	\$1,925,396	\$764,190	\$2,126,154	\$1,228,857
116	Direct Cost of Gas Revenue											
117	Annual	\$211,720,914	\$193,872,470	\$17,848,444	\$5,039,419	\$4,676,747	\$362,672	\$2,066	\$21,845,465	\$4,170,250	\$45,281,911	\$16,781,203
118	Winter	\$174,578,033	\$160,025,269	\$14,552,764	\$2,955,273	\$2,735,009	\$220,264	\$1,046	\$19,522,721	\$2,496,503	\$38,681,141	\$9,906,568
119	Summer	\$37,142,881	\$33,847,201	\$3,295,680	\$2,084,146	\$1,941,738	\$142,408	\$1,020	\$2,322,744	\$1,673,747	\$6,600,770	\$6,874,636
120	Indirect Cost of Gas Revenue											
121	Annual	\$13,284,341	\$12,161,350	\$1,122,991	\$293,575	\$272,538	\$21,037	\$125	\$1,274,947	\$266,334	\$2,706,786	\$1,011,912
122	Winter	\$10,657,698	\$9,773,374	\$884,324	\$140,178	\$129,837	\$10,341	\$46	\$1,123,003	\$142,128	\$2,259,810	\$503,696
123	Summer	\$2,626,643	\$2,387,976	\$238,667	\$153,397	\$142,701	\$10,696	\$79	\$151,944	\$124,206	\$446,975	\$508,216
124	Deferred Gas Costs											
125	Annual	\$11,561,095	\$10,574,277	\$986,818	\$298,440	\$276,703	\$21,737	\$127	\$1,088,006	\$207,518	\$1,803,283	\$640,304
126	Winter	\$9,422,371	\$8,629,955	\$792,415	\$174,614	\$161,514	\$13,100	\$65	\$974,385	\$121,918	\$1,564,112	\$378,823
127	Summer	\$2,138,724	\$1,944,321	\$194,403	\$123,826	\$115,188	\$8,637	\$62	\$113,620	\$85,600	\$239,171	\$261,480
128	LDAC Revenue											
129	Annual	\$3,485,399	\$3,193,452	\$291,947	\$53,331	\$49,710	\$3,621	\$8	\$319,719	\$80,950	\$705,387	\$333,306
130	Winter	\$2,770,292	\$2,543,322	\$226,970	\$20,423	\$19,096	\$1,327	\$2	\$264,368	\$37,414	\$549,519	\$157,285
131	Summer	\$715,107	\$650,130	\$64,977	\$32,908	\$30,614	\$2,294	\$6	\$55,351	\$43,536	\$155,868	\$176,021
132	Total											
133	Annual	\$328,667,115	\$304,180,734	\$24,486,381	\$11,003,222	\$10,364,622	\$638,599	\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
134	Winter	\$267,154,438	\$247,496,759	\$19,657,679	\$6,194,858	\$5,817,077	\$377,782	\$1,398	\$29,658,467	\$3,943,170	\$52,577,553	\$13,362,701
135	Summer	\$61,512,677	\$56,683,974	\$4,828,702	\$4,808,363	\$4,547,546	\$260,818	\$1,406	\$4,569,056	\$2,691,279	\$9,568,938	\$9,049,209
136												
137	<b><u>COST STUDY INFORMATION</u></b>											
138												
139	Target ACS Base Revenue											
140	Annual	\$100,492,047			\$10,856,303			\$345	\$11,303,039	\$2,347,139	\$12,855,832	\$4,199,180
141	Winter	\$67,185,084			\$5,808,404			\$243	\$7,702,146	\$1,390,455	\$10,179,177	\$2,876,642
142	Summer	\$33,306,963			\$5,047,899			\$101	\$3,600,893	\$956,684	\$2,676,656	\$1,322,539
143												
144	Direct Gas Cost for New Rates											
145	Annual	\$220,161,443	\$201,369,526	\$18,791,916	\$5,553,949	\$5,149,614	\$404,335	\$2,374	\$20,721,910	\$3,861,651	\$34,343,363	\$11,913,936
146	Winter	\$179,486,460	\$164,391,763	\$15,094,697	\$3,213,507	\$2,972,427	\$241,080	\$1,198	\$18,561,038	\$2,243,719	\$29,794,722	\$6,971,671
147	Summer	\$40,674,983	\$36,977,763	\$3,697,220	\$2,340,442	\$2,177,187	\$163,255	\$1,176	\$2,160,872	\$1,617,932	\$4,548,641	\$4,942,265
148												
149	Indirect Gas Cost for New Rates											
150	Annual	\$12,195,262	\$11,164,011	\$1,031,251	\$230,087	\$212,979	\$17,108	\$90	\$1,219,427	\$160,448	\$1,979,482	\$497,484
151	Winter	\$11,365,857	\$10,409,995	\$955,861	\$200,903	\$185,831	\$15,072	\$75	\$1,175,365	\$140,274	\$1,886,730	\$435,857
152	Summer	\$829,406	\$754,015	\$75,390	\$29,183	\$27,148	\$2,036	\$15	\$44,062	\$20,174	\$92,752	\$61,626
153												
154	Direct Cost of Gas Rates (New)											
155	Winter	\$0.8891	\$0.8891	\$0.8891	\$0.8589	\$0.8589	\$0.8589	\$0.8589	\$0.8891	\$0.8589	\$0.8891	\$0.8589
156	Summer	\$0.8876	\$0.8876	\$0.8876	\$0.8822	\$0.8822	\$0.8822	\$0.8822	\$0.8876	\$0.8822	\$0.8876	\$0.8822
157	Indirect Cost of Gas Rates (New)											
158	Winter	\$0.0563	\$0.0563	\$0.0563	\$0.0537	\$0.0537	\$0.0537	\$0.0537	\$0.0563	\$0.0537	\$0.0563	\$0.0537
159	Summer	\$0.0181	\$0.0181	\$0.0181	\$0.0110	\$0.0110	\$0.0110	\$0.0110	\$0.0181	\$0.0110	\$0.0181	\$0.0110
160												
161	Target Customer Charge-MCOS	\$32.45			\$33.41				\$47.73	\$51.52	\$85.47	\$82.21
162	Target Customer Charge-ACS	\$23.30			\$24.22			\$0.61	\$34.63	\$42.57	\$82.80	\$89.22
163	Unit Marginal Cost (\$ / winter therm)	\$0.1156			\$0.0652			NA	\$0.1396	\$0.0683	\$0.1255	\$0.0643
164	Unit Marginal Cost (\$ / summer therm)	\$0.0640			\$0.0307			NA	\$0.0804	\$0.0324	\$0.0711	\$0.0306

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Annual High Winter	C&I (53) Ex. High Annual Low Winter	Special Contract	Company Total	Notes
110								
111	<b><u>Summary of TY Rev. w/ Imputed Gas Costs</u></b>							
112	Test Year Base Revenue							
113	Annual	\$6,990,909	\$3,306,391	\$1,140,743	\$5,569,437	\$3,502,265		line 114 + line 115
114	Winter	\$6,110,724	\$2,432,175	\$985,737	\$3,985,162	\$1,746,926		line 75
115	Summer	\$880,185	\$874,216	\$155,006	\$1,584,275	\$1,755,339		line 76
116	Direct Cost of Gas Revenue							
117	Annual	\$35,880,883	\$20,780,586	\$7,562,276	\$44,786,601		\$413,851,574	line 118 + line 119
118	Winter	\$29,546,593	\$11,985,600	\$5,622,453	\$23,619,529			line 80 + line 105
119	Summer	\$6,334,291	\$8,794,985	\$1,939,823	\$21,167,072			line 81 + line 106
120	Indirect Cost of Gas Revenue							
121	Annual	\$2,301,129	\$1,311,775	\$494,746	\$2,912,531		\$25,858,200	line 122 + line 123
122	Winter	\$1,758,767	\$597,160	\$337,526	\$1,174,051			line 83 + line 108
123	Summer	\$542,362	\$714,615	\$157,220	\$1,738,479			line 84 + line 109
124	Deferred Gas Costs							\$17,079,967
125	Annual	\$816,017	\$311,118	\$206,853	\$147,207		\$17,079,967	line 126 + line 127
126	Winter	\$681,414	\$177,572	\$146,026	\$106,741			line 100 * (line 32 + line 42)
127	Summer	\$134,604	\$133,546	\$60,827	\$40,466			line 101 * (line 33 + line 43)
128	LDAC Revenue							
129	Annual	\$583,723	\$401,772	\$125,985	\$873,282		\$6,962,862	line 130 + line 131
130	Winter	\$434,212	\$182,500	\$79,946	\$351,731			line 86
131	Summer	\$149,511	\$219,272	\$46,039	\$521,551			line 87
132	Total							
133	Annual	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 134 + line 135
134	Winter	\$38,531,710	\$15,375,007	\$7,171,688	\$29,237,214			line 114 + line 118 + line 122 + line 126 + line 130
135	Summer	\$8,040,952	\$10,736,635	\$2,358,915	\$25,051,843			line 115 + line 119 + line 123 + line 127 + line 131
136								
137	<b><u>COST STUDY INFORMATION</u></b>							
138								
139	Target ACS Base Revenue							
140	Annual	\$8,252,580	\$3,549,167	\$1,455,970	\$5,790,935	\$3,921,013	\$161,102,537	line 141 + line 142
141	Winter	\$6,953,781	\$2,626,714	\$1,284,399	\$4,397,478		\$110,404,524	without special contracts
142	Summer	\$1,298,798	\$922,452	\$171,571	\$1,393,457		\$50,698,013	without special contracts
143								
144	Direct Gas Cost for New Rates							
145	Annual	\$15,540,169	\$5,792,104	\$3,938,465	\$2,729,254		\$324,558,618	line 146 + line 147
146	Winter	\$12,980,232	\$3,267,937	\$2,781,643	\$1,964,403		\$261,266,529	
147	Summer	\$2,559,938	\$2,524,167	\$1,156,822	\$764,851		\$63,292,089	
148								
149	Indirect Gas Cost for New Rates							
150	Annual	\$874,164	\$235,780	\$199,734	\$132,348		\$17,724,307	line 151 + line 152
151	Winter	\$821,964	\$204,306	\$176,146	\$122,811		\$16,530,288	
152	Summer	\$52,200	\$31,474	\$23,589	\$9,537		\$1,194,018	
153								
154	Direct Cost of Gas Rates (New)							
155	Winter	\$0.8891	\$0.8589	\$0.8891	\$0.8589			line 146 / (line 32 + line 42)
156	Summer	\$0.8876	\$0.8822	\$0.8876	\$0.8822			line 147 / (line 33 + line 43)
157	Indirect Cost of Gas Rates (New)							
158	Winter	\$0.0563	\$0.0537	\$0.0563	\$0.0537			line 151 / (line 32 + line 42)
159	Summer	\$0.0181	\$0.0110	\$0.0181	\$0.0110			line 152 / (line 33 + line 43)
160								
161	Target Customer Charge-MCOS	\$351.39	\$355.73	\$1,001.16	\$906.18			Linked to COS Schedules
162	Target Customer Charge-ACS	\$261.13	\$307.22	\$799.10	\$762.87			
163	Unit Marginal Cost (\$ / winter therm)	\$0.1134	\$0.0543	\$0.1272	\$0.0618			
164	Unit Marginal Cost (\$ / summer therm)	\$0.0634	\$0.0254	\$0.0669	\$0.0272			

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
165	<b><u>Imputed Gas Costs for Trans. Cust.</u></b>											
166	Direct Gas Adjustment Factor											
167	Winter	\$57,311	\$57,311	\$0	\$859	\$859	\$0	\$0	\$1,476,953	\$419,052	\$11,253,365	\$3,733,137
168	Summer	\$14,267	\$14,267	\$0	\$733	\$733	\$0	\$0	\$250,434	\$247,382	\$2,252,534	\$2,502,711
169	Indirect Gas Adjustment Factor											
170	Winter	\$3,320	\$3,320	\$0	\$38	\$38	\$0	\$0	\$80,920	\$22,746	\$631,887	\$182,819
171	Summer	\$954	\$954	\$0	\$51	\$51	\$0	\$0	\$15,618	\$17,465	\$147,198	\$178,237
172												
173	<b><u>Incremental LDAC Revenue</u></b>											
174												
175	Incremental LDAC Rate											
176	Winter	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114
177	Summer	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114
178	Incremental LDAC Revenue											
179	Winter	\$2,303,953	\$2,110,252	\$193,701	\$42,695	\$39,493	\$3,202	\$16	\$256,677	\$35,480	\$530,743	\$145,360
180	Summer	\$522,987	\$475,466	\$47,520	\$30,278	\$28,167	\$2,111	\$15	\$30,956	\$24,348	\$87,171	\$98,442
181												
182	<b><u>Revenue Other Than Base (New)</u></b>											
183												
184	Direct Cost of Gas Revenue											
185	Annual	\$220,233,021	\$201,441,105	\$18,791,916	\$5,555,541	\$5,151,206	\$404,335	\$2,374	\$22,449,297	\$4,528,085	\$47,849,261	\$18,149,783
186	Winter	\$179,543,771	\$164,449,074	\$15,094,697	\$3,214,366	\$2,973,286	\$241,080	\$1,198	\$20,037,991	\$2,662,770	\$41,048,087	\$10,704,807
187	Summer	\$40,689,250	\$36,992,030	\$3,697,220	\$2,341,175	\$2,177,920	\$163,255	\$1,176	\$2,411,306	\$1,865,315	\$6,801,175	\$7,444,976
188	Indirect Cost of Gas Revenue											
189	Annual	\$12,199,536	\$11,168,284	\$1,031,251	\$230,176	\$213,068	\$17,108	\$90	\$1,315,966	\$200,659	\$2,758,567	\$858,539
190	Winter	\$11,369,176	\$10,413,315	\$955,861	\$200,942	\$185,870	\$15,072	\$75	\$1,256,285	\$163,020	\$2,518,618	\$618,677
191	Summer	\$830,360	\$754,969	\$75,390	\$29,234	\$27,199	\$2,036	\$15	\$59,681	\$37,639	\$239,950	\$239,863
192	LDAC Revenue											
193	Annual	\$6,312,338	\$5,779,170	\$533,168	\$126,304	\$117,370	\$8,934	\$39	\$607,352	\$140,778	\$1,323,301	\$577,108
194	Winter	\$5,074,245	\$4,653,574	\$420,671	\$63,118	\$58,589	\$4,529	\$18	\$521,045	\$72,894	\$1,080,262	\$302,645
195	Summer	\$1,238,094	\$1,125,596	\$112,497	\$63,186	\$58,781	\$4,405	\$21	\$86,307	\$67,884	\$243,039	\$274,463
196	Total											
197	Annual	\$238,744,895	\$218,388,559	\$20,356,336	\$5,912,021	\$5,481,644	\$430,377	\$2,503	\$24,372,615	\$4,869,522	\$51,931,130	\$19,585,430
198	Winter	\$195,987,192	\$179,515,963	\$16,471,229	\$3,478,425	\$3,217,744	\$260,681	\$1,291	\$21,815,321	\$2,898,685	\$44,646,966	\$11,626,129
199	Summer	\$42,757,703	\$38,872,596	\$3,885,107	\$2,433,596	\$2,263,900	\$169,696	\$1,212	\$2,557,294	\$1,970,838	\$7,284,164	\$7,959,301
200												
201	<b><u>REVENUE ALLOCATION</u></b>											
202												
203	Percent ACS Base Revenue											
204	Annual	62.38%			6.74%			0.0002%	7.02%	1.46%	7.98%	2.61%
205	Winter	60.85%			5.26%			0.0002%	6.98%	1.26%	9.22%	2.61%
206	Summer	65.70%			9.96%			0.0002%	7.10%	1.89%	5.28%	2.61%
207	<b>Base Revenue Requirement</b>											
208	Other Fees Increase											
209	<b>Revenue Assigned to Special Contracts</b>											
210												
211	Incremental LDAC	\$2,826,939			\$72,973			\$31	\$287,633	\$59,828	\$617,914	\$243,802
212	Remaining Revenue Requirement											
213	Target Allocation of Revenue Requirement	\$96,950,986			\$10,473,757			\$333	\$10,904,751	\$2,264,432	\$12,402,828	\$4,051,213
214	Base Revenue Increment											
215	Total Revenue											
216	Test Year Revenue	\$328,667,115			\$11,003,222			\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
217	Target Revenue	\$335,695,881			\$16,385,778			\$2,835	\$35,277,366	\$7,133,955	\$64,333,958	\$23,636,643
218	Increase at Target	\$7,028,766			\$5,382,556			\$31	\$1,049,844	\$499,506	\$2,187,467	\$1,224,732
219	Percent Increase at Target	2.14%			48.92%			1.10%	3.07%	7.53%	3.52%	5.46%



**Bay State Gas Company  
Rate Design**

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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
165	<u>Imputed Gas Costs for Trans. Cust.</u>						\$113,101,512	Hold Constant at Test Year Levels
166	Direct Gas Adjustment Factor						\$113,101,512	
167	Winter	\$18,160,054	\$9,054,121	\$3,338,573	\$21,799,382		\$69,292,806	line 105
168	Summer	\$3,927,415	\$6,545,332	\$842,530	\$20,496,779		\$37,080,117	line 106
169	Indirect Gas Adjustment Factor							
170	Winter	\$1,057,570	\$446,838	\$194,425	\$1,075,840		\$3,696,404	line 108
171	Summer	\$370,188	\$538,074	\$79,415	\$1,684,985		\$3,032,185	line 109
172								
173	<u>Incremental LDAC Revenue</u>						\$5,630,282	Exhibit BSG/JES-4
174								
175	Incremental LDAC Rate						\$0.0114	line 173 / (total therms-special contracts)
176	Winter	\$0.0114	\$0.0114	\$0.0114	\$0.0114			Company Total: line 175
177	Summer	\$0.0114	\$0.0114	\$0.0114	\$0.0114			
178	Incremental LDAC Revenue						\$5,630,282	check
179	Winter	\$419,921	\$168,357	\$82,272	\$326,933		\$4,312,407	line 53 * line 176
180	Summer	\$83,616	\$122,630	\$25,748	\$291,684		\$1,317,875	line 54 * line 177
181								
182	<u>Revenue Other Than Base (New)</u>							
183								
184	Direct Cost of Gas Revenue							
185	Annual	\$37,627,638	\$21,391,558	\$8,119,568	\$45,025,415		\$430,931,541	line 186 + line 187
186	Winter	\$31,140,285	\$12,322,059	\$6,120,216	\$23,763,785		\$330,559,335	line 146 + line 167
187	Summer	\$6,487,352	\$9,069,499	\$1,999,352	\$21,261,630		\$100,372,206	line 147 + line 168
188	Indirect Cost of Gas Revenue							
189	Annual	\$2,301,922	\$1,220,693	\$473,575	\$2,893,174		\$24,452,896	line 190 + line 191
190	Winter	\$1,879,534	\$651,144	\$370,571	\$1,198,652		\$20,226,692	line 151 + line 170
191	Summer	\$422,388	\$569,549	\$103,004	\$1,694,522		\$4,226,204	line 152 + line 171
192	LDAC Revenue							
193	Annual	\$1,087,260	\$692,760	\$234,005	\$1,491,899		\$12,593,144	line 194 + line 195
194	Winter	\$854,133	\$350,857	\$162,218	\$678,664		\$9,160,099	line 130 + line 179
195	Summer	\$233,127	\$341,902	\$71,787	\$813,235		\$3,433,045	line 131 + line 180
196	Total							
197	Annual	\$41,016,820	\$23,305,010	\$8,827,147	\$49,410,488		\$467,977,581	line 198 + line 199
198	Winter	\$33,873,952	\$13,324,060	\$6,653,005	\$25,641,101		\$359,946,127	line 186 + line 190 + line 194
199	Summer	\$7,142,868	\$9,980,950	\$2,174,142	\$23,769,387		\$108,031,454	line 187 + line 191 + line 195
200								
201	<u>REVENUE ALLOCATION</u>							
202								
203	Percent ACS Base Revenue							
204	Annual	5.12%	2.20%	0.90%	3.59%	NA	100.00%	line 140 / (company total - sp contracts)
205	Winter	6.30%	2.38%	1.16%	3.98%	NA	100.00%	line 141 / (company total - sp contracts)
206	Summer	2.56%	1.82%	0.34%	2.75%	NA	100.00%	line 142 / (company total - sp contracts)
207	Base Revenue Requirement						\$165,023,551	
208	Other Fees Increase						\$46,525	Schs. JAF-1-8, 1-10; Input
209	Revenue Assigned to Special Contracts					\$3,921,013	\$3,921,013	Test year plus allocated increase
210								
211	Incremental LDAC	\$503,537	\$290,988	\$108,020	\$618,617	\$0	\$5,630,282	line 179 + line 180
212	Remaining Revenue Requirement						\$155,425,730	line 208 - sum (lines 208, 209, and 211)
213	Target Allocation of Revenue Requirement	\$7,961,782	\$3,424,104	\$1,404,665	\$5,586,879		\$155,425,730	line 204 * Company Total line 212
214	Base Revenue Increment						\$17,580,855	line 213 -(Company Total:line 74-Contracts:line 74)
215	Total Revenue							
216	Test Year Revenue	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 133
217	Target Revenue	\$48,978,602	\$26,729,114	\$10,231,812	\$54,997,367		\$623,403,311	line 197 + line 213
218	Increase at Target	\$2,405,939	\$617,472	\$701,210	\$708,310		\$21,805,834	line 217 - line 216
219	Percent Increase at Target	5.17%	2.36%	7.36%	1.30%		3.62%	line 218 / line 216

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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
220	Revenue Increase Cap of 6%	\$19,720,027			\$660,193			\$168	\$2,053,651	\$398,067	\$3,728,789	\$1,344,715
221	Revenue to Re-allocate	NA			\$4,722,363			NA	NA	\$101,439	NA	NA
222												
223	Total Revenue to Re-allocate											
224	Test Year Revenue for Re-allocation	\$328,667,115			NA			\$2,804	\$34,227,522	NA	\$62,146,491	\$22,411,911
225	Percent Assignment	57.22%						0.00%	5.96%		10.82%	3.90%
226	First Re-allocation	\$2,834,024						\$24	\$295,136		\$535,875	\$193,253
227	Increase with First Re-allocation	\$9,862,790			\$660,193			\$55	\$1,344,980	\$398,067	\$2,723,343	\$1,417,985
228	Revenue to Re-allocate	none			none			none	none	none	none	\$73,271
229	Test Year Revenue for Re-allocation	\$328,667,115			NA			NA	\$34,227,522	NA	\$62,146,491	NA
230	Percent Assignment	65.03%							6.77%		12.30%	
231	Second Re-allocation	\$56,206							\$5,853		\$10,628	
232	Increase with Second Re-allocation	\$9,918,995			\$660,193			\$55	\$1,350,834	\$398,067	\$2,733,970	\$1,344,715
233	Revenue to Re-allocate	none			none			none	none	none	none	none
234												
235												
236												
237												
238												
239												
240	Change from Target Allocation	\$2,890,229			-\$4,722,363			\$24	\$300,990	-\$101,439	\$546,503	\$119,982
241												
242	Base Revenue Requirement	\$99,841,215			\$5,751,394			\$357	\$11,205,741	\$2,162,993	\$12,949,332	\$4,171,195
243	Total Revenue Requirement	\$338,586,110			\$11,663,415			\$2,860	\$35,578,356	\$7,032,515	\$64,880,461	\$23,756,625
244	Percent Increase	3.02%			6.00%			1.97%	3.95%	6.00%	4.40%	6.00%
245												
246												
247	RATE DESIGN											
248												
249	Proposed Block Sizes											
250												
251	First Block Size											
252	Winter		125	NA		12	NA	NA	NA	NA	NA	NA
253	Summer		30	NA		10	NA	NA	NA	NA	NA	NA
254												
255	Test Year Therms											
256	Annual	247,783,289	226,640,087	21,143,202	6,396,166	5,930,437	465,729	2,728	25,211,236	5,243,986	54,160,592	21,369,383
257	Winter	201,943,124	184,965,126	16,977,998	3,742,241	3,461,572	280,669	1,395	22,497,947	3,109,876	46,519,987	12,740,904
258	Summer	45,840,165	41,674,961	4,165,204	2,653,925	2,468,865	185,060	1,333	2,713,289	2,134,110	7,640,605	8,628,479
259												
260	Percent of Therms in Proposed 1st Block											
261	Winter	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
262	Summer	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
263												
264	Proposed First Block Therms											
265	Winter	201,943,124	184,965,126	16,977,998	3,742,241	3,461,572	280,669	1,395	22,497,947	3,109,876	46,519,987	12,740,904
266	Summer	45,840,165	41,674,961	4,165,204	2,653,925	2,468,865	185,060	1,333	2,713,289	2,134,110	7,640,605	8,628,479
267												
268	Proposed Second Block Therms											
269	Winter	0	0	0	0	0	0	0	0	0	0	0
270	Summer	0	0	0	0	0	0	0	0	0	0	0
271												
272	Base Revenue Requirement	\$99,841,215			\$5,751,394			\$357	\$11,205,741	\$2,162,993	\$12,949,332	\$4,171,195
273												

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		C&I (42)	C&I (52)	C&I (43)	C&I (53)	Ex.		
line	Description	High Annual High Winter	High Annual Low Winter	Ex. High Ann. High Winter	High Ann. Low Winter	Special Contract	Company Total	Notes
220	Revenue Increase Cap of 6%	\$2,794,360	\$1,566,699	\$571,836	\$3,257,343			line 216 * 6%
221	Revenue to Re-allocate	NA	NA	\$129,374	NA		\$4,953,176	line 218 - line 220
222								
223	Total Revenue to Re-allocate						\$4,953,176	line 221 - line 222
224	Test Year Revenue for Re-allocation	\$46,572,662	\$26,111,642	NA	\$54,289,057		\$574,429,205	line 216
225	Percent Assignment	8.11%	4.55%		9.45%		100.00%	line 224 / Company Total line 224
226	First Re-allocation	\$401,586	\$225,155		\$468,123		\$4,953,176	line 225 * Company Total line 223
227	Increase with First Re-allocation	\$2,807,525	\$842,627	\$571,836	\$1,176,432		\$21,805,834	line 220 or line 226 + line 218
228	Revenue to Re-allocate	\$13,165	none	none	none		\$86,436	line 227 - line 220
229	Test Year Revenue for Re-allocation	NA	\$26,111,642	NA	\$54,289,057		\$505,441,827	line 224
230	Percent Assignment		5.17%		10.74%		100.00%	line 229 / Company Total line 229
231	Second Re-allocation		\$4,465		\$9,284		\$86,436	line 230 * Company Total line 228
232	Increase with Second Re-allocation	\$2,794,360	\$847,092	\$571,836	\$1,185,716		\$21,805,834	line 227 + line 231 or line 220
233	Revenue to Re-allocate	none	none	none	none		\$0	
234								
235								
236								
237								
238								
239								
240	Change from Target Allocation	\$388,420	\$229,620	-\$129,374	\$477,407		\$0	line 232 - line 218
241								
242	Base Revenue Requirement	\$8,350,202	\$3,653,724	\$1,275,292	\$6,064,285		\$155,425,730	line 213 + line 240
243	Total Revenue Requirement	\$49,367,022	\$26,958,734	\$10,102,439	\$55,474,773		\$623,403,311	line 217 + line 240
244	Percent Increase	6.00%	3.24%	6.00%	2.18%			(line 243 - line 216) / line 216
245								
246								
247	RATE DESIGN							
248								
249	Proposed Block Sizes							
250								
251	First Block Size							
252	Winter	NA	NA	NA	NA			See Ex. BSG/JAF-2; Schedule JAF-2-3
253	Summer	NA	NA	NA	NA			See Ex. BSG/JAF-2; Schedule JAF-2-3
254								
255	Test Year Therms							
256	Annual	44,135,406	25,505,268	9,468,031	54,222,227		493,498,312	line 257 + line 258
257	Winter	36,806,379	14,756,628	7,211,204	28,655,953			line 53
258	Summer	7,329,027	10,748,640	2,256,827	25,566,274			line 54
259								
260	Percent of Therms in Proposed 1st Block							See Ex. BSG/JAF-2; Schedule JAF-2-3
261	Winter	100.00%	100.00%	100.00%	100.00%			
262	Summer	100.00%	100.00%	100.00%	100.00%			
263								
264	Proposed First Block Therms							
265	Winter	36,806,379	14,756,628	7,211,204	28,655,953			line 257 * line 261
266	Summer	7,329,027	10,748,640	2,256,827	25,566,274			line 258 * line 262
267								
268	Proposed Second Block Therms							
269	Winter	0	0	0	0			
270	Summer	0	0	0	0			
271								
272	Base Revenue Requirement	\$8,350,202	\$3,653,724	\$1,275,292	\$6,064,285		\$155,425,730	line 242
273								

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		Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
274	Proposed Customer Charge	\$12.10			\$11.60			\$2.48	\$19.00	\$19.00	\$65.00	\$65.00
275	Customer Charge Revenue	\$32,264,577			\$4,645,974			\$357	\$3,803,914	\$758,252	\$3,652,675	\$1,369,745
276	Winter Customer Charge Revenue	\$16,231,339			\$2,259,135				\$1,924,966	\$383,249	\$1,817,465	\$696,670
277	Remaining Revenue	\$67,576,638			\$1,105,420			\$0	\$7,401,827	\$1,404,741	\$9,296,657	\$2,801,450
278	Summer Customer Charge Revenue	\$16,033,238			\$2,386,839							
279	Volumetric Revenue Requirement	\$67,576,638			\$1,105,420			\$0	\$7,401,827	\$1,404,741	\$9,296,657	\$2,801,450
280	Demand-Based Revenue Requirement	\$0			\$0			\$0	\$0	\$0	\$0	\$0
281	Average Volumetric Rate	\$0.2727			\$0.1728			\$0.0000	\$0.2936	\$0.2679	\$0.1716	\$0.1311
282	ACS Seasonal Split - Volumetric Req.											
283	Winter Percentage	74.68%			57.15%			70.64%	77.04%	63.39%	90.86%	77.05%
284	Summer Percentage	25.32%			42.85%			29.36%	22.96%	36.61%	9.14%	22.95%
285	Average Volumetric Rate - Winter	\$0.2499			\$0.1688			\$0.0000	\$0.2535	\$0.2863	\$0.1816	\$0.1694
286	Average Volumetric Rate - Summer	\$0.3732			\$0.1785			\$0.0000	\$0.6264	\$0.2410	\$0.1112	\$0.0745
287	Volumetric Revenue Requirement - Winter	\$50,467,690			\$631,759			\$0	\$5,702,223	\$890,474	\$8,446,662	\$2,158,410
288	Volumetric Revenue Requirement - Summer	\$17,108,948			\$473,661			\$0	\$1,699,604	\$514,267	\$849,994	\$643,040
289												
290	Unit Marginal Cost (\$ / winter therm)	\$0.1156			\$0.0652			NA	\$0.1396	\$0.0683	\$0.1255	\$0.0643
291	Unit Marginal Cost (\$ / summer therm)	\$0.0640			\$0.0307			NA	\$0.0804	\$0.0324	\$0.0711	\$0.0306
292	Ratio of Second Block to MC											
293	Winter	flat			flat			NA	flat	flat	flat	flat
294	Summer	flat			flat			NA	flat	flat	flat	flat
295												
296	Second Block Rate											
297	Winter	\$0.2499			\$0.1688			\$0.0000	\$0.2936	\$0.2679	\$0.1816	\$0.1694
298	Summer	\$0.3732			\$0.1785			\$0.0000	\$0.2936	\$0.2679	\$0.1112	\$0.0745
299												
300	Revenue Generated											
301	Annual	\$67,576,638			\$1,105,420			\$0	\$7,401,827	\$1,404,741	\$9,296,657	\$2,801,450
302	Winter	\$50,467,690			\$631,759			\$0	\$6,605,226	\$833,063	\$8,446,662	\$2,158,410
303	Summer	\$17,108,948			\$473,661			\$0	\$796,601	\$571,678	\$849,994	\$643,040
304												
305	Remaining Revenue											
306	Annual	\$0			\$0			\$0	\$0	\$0	\$0	\$0
307	Winter	\$0			\$0			\$0	\$0	\$0	\$0	\$0
308	Summer	\$0			\$0			\$0	\$0	\$0	\$0	\$0
309												
310	First Block Surcharge											
311	Winter	\$0.0000			\$0.0000			NA	NA	NA	NA	NA
312	Summer	\$0.0000			\$0.0000			NA	NA	NA	NA	NA
313												
314	Demand Charge Revenue Requirement											
315	Winter	NA			NA			NA	NA	NA	NA	NA
316	Summer	NA			NA			NA	NA	NA	NA	NA
317												
318	Demand Charge Rates											
319	Winter	NA			NA			NA	NA	NA	NA	NA
320	Summer	NA			NA			NA	NA	NA	NA	NA
321												

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		C&I (42)	C&I (52)	C&I (43)	C&I (53)	Ex.		
line	Description	High Annual High Winter	High Annual Low Winter	Ex. High Ann. High Winter	High Ann. Low Winter	Special Contract	Company Total	Notes
274	Proposed Customer Charge	\$213.00	\$213.00	\$781.00	\$781.00			See Ex. BSG/JAF-2; Schedule JAF-2-2
275	Customer Charge Revenue	\$1,583,016	\$636,657	\$141,361	\$624,019		\$49,480,547	line 274 * line 27
276	Winter Customer Charge Revenue	\$780,006	\$325,890	\$71,852	\$320,210			line 274 * line 28
277	Remaining Revenue	\$6,767,186	\$3,017,067	\$1,133,931	\$5,440,266		\$105,945,183	line 272 - line 275
278	Summer Customer Charge Revenue							
279	Volumetric Revenue Requirement	\$6,767,186	\$3,017,067	\$340,179	\$1,632,080			For 43 & 53, 30% of the remaining revenues
280	Demand-Based Revenue Requirement	\$0	\$0	\$793,751	\$3,808,186			are assigned to the volumetric charges.
281	Average Volumetric Rate	\$0.1533	\$0.1183	\$0.0359	\$0.0301			line 279 / line 256
282	ACS Seasonal Split - Volumetric Req.							
283	Winter Percentage	92.57%	79.00%	92.24%	78.91%			(line 141 - line 276) / (line 140 - line 275)
284	Summer Percentage	7.43%	21.00%	7.76%	21.09%			100% - line 283
285	Average Volumetric Rate - Winter	\$0.1702	\$0.1615	\$0.0435	\$0.0449			line 287 / line 257
286	Average Volumetric Rate - Summer	\$0.0686	\$0.0590	\$0.0117	\$0.0135			line 288 / line 258
287	Volumetric Revenue Requirement - Winter	\$6,264,141	\$2,383,423	\$313,769	\$1,287,891			line 283 * line 279
288	Volumetric Revenue Requirement - Summer	\$503,045	\$633,644	\$26,410	\$344,188			line 279 - line 287
289								
290	Unit Marginal Cost (\$ / winter therm)	\$0.1134	\$0.0543	\$0.1272	\$0.0618			line 163
291	Unit Marginal Cost (\$ / summer therm)	\$0.0634	\$0.0254	\$0.0669	\$0.0272			line 164
292	Ratio of Second Block to MC							
293	Winter	flat	flat	flat	flat			Inputs
294	Summer	flat	flat	flat	flat			
295								
296	Second Block Rate							
297	Winter	\$0.1702	\$0.1615	\$0.0447	\$0.0447			line 293 * line 290 or line 287 / line 53
298	Summer	\$0.0686	\$0.0590	\$0.0133	\$0.0133			line 294 * line 291 or line 288 / line 54
299								
300	Revenue Generated							
301	Annual	\$6,767,186	\$3,017,067	\$352,079	\$1,620,180			line 302 + line 303
302	Winter	\$6,264,141	\$2,383,423	\$322,019	\$1,279,642			line 257 * line 297
303	Summer	\$503,045	\$633,644	\$30,061	\$340,538			line 258 * line 298
304								
305	Remaining Revenue							
306	Annual	\$0	\$0	\$0	\$0			line 307 + line 308
307	Winter	\$0	\$0	\$0	\$0			line 287 - line 302
308	Summer	\$0	\$0	\$0	\$0			line 288 - line 303
309								
310	First Block Surcharge							
311	Winter	NA	NA	NA	NA			line 307 / line 265
312	Summer	NA	NA	NA	NA			line 308 / line 266
313								
314	Demand Charge Revenue Requirement							
315	Winter	NA	NA	\$732,127	\$3,005,080			line 280 * line 283
316	Summer	NA	NA	\$61,624	\$803,106			line 280 - line 315
317								
318	Demand Charge Rates							
319	Winter	NA	NA	\$2.1586	\$2.1586			line 315 / line 56
320	Summer	NA	NA	\$0.6713	\$0.6713			line 316 / line 57
321								

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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
322	<b><u>Base Rates w/o Low Inc. Discount</u></b>											
323												
324	Monthly Customer Charge	\$12.10			\$11.60			\$2.48	\$19.00	\$19.00	\$65.00	\$65.00
325	Winter Volumetric Rates											
326	First Block Rate	\$0.2499			\$0.1688			\$0.0	\$0.2936	\$0.2679	\$0.1816	\$0.1694
327	Second Block Rate	NA			NA			\$0.0	NA	NA	NA	NA
328	Summer Volumetric Rates											
329	First Block Rate	\$0.3732			\$0.1785			\$0.0	\$0.2936	\$0.2679	\$0.1112	\$0.0745
330	Second Block Rate	NA			NA			\$0.0	NA	NA	NA	NA
331	Demand Rate											
332	Winter	NA			NA			NA	NA	NA	NA	NA
333	Summer	NA			NA			NA	NA	NA	NA	NA
334												
335	<b><u>Revenue Generated</u></b>											
336	Monthly Customer Charge	\$32,264,577			\$4,645,974			\$357	\$3,803,914	\$758,252	\$3,652,675	\$1,369,745
337	Winter Volumetric Rates											
338	First Block Rate	\$50,467,690			\$631,759			NA	\$6,605,226	\$833,063	\$8,446,662	\$2,158,410
339	Second Block Rate	NA			NA			NA	NA	NA	NA	NA
340	Summer Volumetric Rates											
341	First Block Rate	\$17,108,948			\$473,661			NA	\$796,601	\$571,678	\$849,994	\$643,040
342	Second Block Rate	NA			NA			NA	NA	NA	NA	NA
343	Demand Rate											
344	Winter	NA			NA			NA	NA	NA	NA	NA
345	Summer	NA			NA			NA	NA	NA	NA	NA
346	TOTAL PROPOSED BASE REVENUE	\$99,841,215			\$5,751,394			\$357	\$11,205,741	\$2,162,993	\$12,949,332	\$4,171,195
347	check	\$0			\$0			\$0	\$0	\$0	\$0	\$0
348	<b><u>Class Bill Impacts</u></b>											
349	Total Test Year Revenue	\$328,667,115			\$11,003,222			\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
350	Total Proposed Revenue	\$338,586,110			\$11,663,415			\$2,860	\$35,578,356	\$7,032,515	\$64,880,461	\$23,756,625
351	check											
352	Percent Change	3.02%			6.00%			1.97%	3.95%	6.00%	4.40%	6.00%
353												
354												
355	<b><u>Allocation of Low-Income Discount</u></b>											
356	<b>Distribution Rate Base</b>	<b>\$228,590,466</b>			<b>\$17,817,354</b>			<b>\$948</b>	<b>\$25,270,507</b>	<b>\$4,722,501</b>	<b>\$36,540,684</b>	<b>\$11,146,787</b>
357	20% Burner-tip Discount Amount (1)			\$5,754,034			\$148,590					
358	Allocation Percentages	59.18%			4.61%			0.0002%	6.54%	1.22%	9.46%	2.89%
359	Amount Allocated (1)	\$3,493,243			\$272,279			\$14	\$386,175	\$72,168	\$558,402	\$170,341
360												
361	Volumetric Surcharge (1)	\$0.0141			\$0.0426			NA	\$0.0153	\$0.0138	\$0.0103	\$0.0080
362												
363	Revised Discount Amount (2)			\$5,813,649			\$152,555					
364	Amount Allocated (2)	\$3,530,870			\$275,212			\$15	\$390,335	\$72,945	\$564,417	\$172,176
365												
366	Volumetric Surcharge (2)	\$0.0142			\$0.0430			NA	\$0.0155	\$0.0139	\$0.0104	\$0.0081
367												
368	Revised Discount Amount (3)			\$5,814,291			\$152,598					
369	Amount Allocated (3)	\$3,531,276			\$275,243			\$15	\$390,380	\$72,953	\$564,482	\$172,196
370												
371	Volumetric Surcharge (3)	\$0.0143			\$0.0430			NA	\$0.0155	\$0.0139	\$0.0104	\$0.0081
372												
373	Proposed Base Revenue		\$94,657,336	\$2,900,857		\$5,694,022	\$180,016	\$371	\$11,596,121	\$2,235,947	\$13,513,814	\$4,343,391
374	Revised Total Revenue		\$313,045,895	\$23,257,193		\$11,175,667	\$610,393	\$2,874	\$35,968,736	\$7,105,469	\$65,444,943	\$23,928,822
375	Total Test Year Revenue		\$304,180,734	\$24,486,381		\$10,364,622	\$638,599	\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
376	Revised Percent Change		2.91%	-5.02%		7.83%	-4.42%	2.49%	5.09%	7.10%	5.31%	6.77%

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
DTE-05-27  
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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
322	<b><u>Base Rates w/o Low Inc. Discount</u></b>							
323								
324	Monthly Customer Charge	\$213.00	\$213.00	\$781.00	\$781.00			line 274
325	Winter Volumetric Rates							
326	First Block Rate	\$0.1702	\$0.1615	\$0.0447	\$0.0447			line 311 + line 327 or line 297
327	Second Block Rate	NA	NA	NA	NA			line 297
328	Summer Volumetric Rates							
329	First Block Rate	\$0.0686	\$0.0590	\$0.0133	\$0.0133			line 312 + line 330 or line 298
330	Second Block Rate	NA	NA	NA	NA			line 298
331	Demand Rate							
332	Winter	NA	NA	\$2.1586	\$2.1586			line 319
333	Summer	NA	NA	\$0.6713	\$0.6713			line 320
334								
335	<b><u>Revenue Generated</u></b>							
336	Monthly Customer Charge	\$1,583,016	\$636,657	\$141,361	\$624,019			line 324* line 27
337	Winter Volumetric Rates							
338	First Block Rate	\$6,264,141	\$2,383,423	\$322,019	\$1,279,642			line 326 * line 265
339	Second Block Rate	NA	NA	NA	NA			line 327 * line 269
340	Summer Volumetric Rates							
341	First Block Rate	\$503,045	\$633,644	\$30,061	\$340,538			line 329 * line 266
342	Second Block Rate	NA	NA	NA	NA			line 330 * line 270
343	Demand Rate							
344	Winter	NA	NA	\$739,364	\$2,997,844			line 332 * line 56
345	Summer	NA	NA	\$69,320	\$795,411		\$0	line 333 * line 57
346	TOTAL PROPOSED BASE REVENUE	\$8,350,202	\$3,653,724	\$1,302,124	\$6,037,453		\$155,425,730	sum (lines 336 through 345)
347	check	\$0	\$0	\$26,832	-\$26,832			
348	<b><u>Class Bill Impacts</u></b>							
349	Total Test Year Revenue	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 133
350	Total Proposed Revenue	\$49,367,022	\$26,958,734	\$10,129,271	\$55,447,941		\$623,403,311	line 346 + line 197
351	check							
352	Percent Change	6.00%	3.24%	6.28%	2.13%			(line 350 - line 349) / line 349
353								
354								
355	<b><u>Allocation of Low-Income Discount</u></b>							
356	<b>Distribution Rate Base</b>	<b>\$26,258,806</b>	<b>\$11,106,815</b>	<b>\$4,945,453</b>	<b>\$19,854,998</b>		\$386,255,320	COS Input
357	20% Burner-tip Discount Amount (1)						\$5,902,624	Schedule JAF-2-5; line 45
358	Allocation Percentages	6.80%	2.88%	1.28%	5.14%		100.00%	line 356 / Company Total line 356
359	Amount Allocated (1)	\$401,278	\$169,731	\$75,575	\$303,417		\$5,902,624	line 358 * Company Total line 357
360								
361	Volumetric Surcharge (1)	\$0.0091	\$0.0067	\$0.0060	\$0.0060			line 359 / line 52
362								
363	Revised Discount Amount (2)						\$5,966,204	Schedule JAF-2-5; line 69
364	Amount Allocated (2)	\$405,601	\$171,559	\$76,389	\$306,686		\$5,966,204	line 358 * Company Total line 363
365								
366	Volumetric Surcharge (2)	\$0.0092	\$0.0067	\$0.0060	\$0.0060			line 364 / line 52
367								
368	Revised Discount Amount (3)						\$5,966,889	Schedule JAF-2-5; line 95
369	Amount Allocated (3)	\$405,647	\$171,579	\$76,398	\$306,721			line 358 * Company Total line 368
370								
371	Volumetric Surcharge (3)	\$0.0092	\$0.0067	\$0.0060	\$0.0060			line 369 / line 52
372								
373	Proposed Base Revenue	\$8,755,849	\$3,825,303	\$1,378,522	\$6,344,174		\$155,425,723	JAF-2-5; line 121 or line 346 + line 369
374	Revised Total Revenue	\$49,772,669	\$27,130,313	\$10,205,669	\$55,754,662		\$623,403,304	JAF-2-5; line 122 or line 350 + line 369
375	Total Test Year Revenue	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 349
376	Revised Percent Change	6.87%	3.90%	7.08%	2.70%			(line 374 - line 375) / line 375

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
DTE-05-27  
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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
377												
378	<b><u>Proposed Rates w/ Low Income Discount</u></b>											
379												
380	Monthly Customer Charge	NA	\$12.10	\$6.25	NA	\$11.60	\$6.25	\$2.58	\$19.00	\$19.00	\$65.00	\$65.00
381	Winter Volumetric Rates											
382	First Block Rate	NA	\$0.2642	\$0.0682	NA	\$0.2119	\$0.1118	\$0.0	\$0.3091	\$0.2818	\$0.1920	\$0.1775
383	Second Block Rate											
384	Summer Volumetric Rates											
385	First Block Rate	NA	\$0.3875	\$0.0942	NA	\$0.2215	\$0.1272	\$0.0	\$0.3091	\$0.2818	\$0.1217	\$0.0826
386	Second Block Rate											
387	Demand Rate											
388	Winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
389	Summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
390												
391	<b><u>Revenue Proof</u></b>											
392												
393	Monthly Customer Charge	NA	\$29,648,303	\$1,351,381	NA	\$4,413,812	\$125,088	\$371	\$3,803,914	\$758,252	\$3,652,675	\$1,369,745
394	Winter Volumetric Rates											
395	First Block Rate	NA	\$48,860,736	\$1,157,182	NA	\$733,337	\$31,392	\$0	\$6,953,592	\$876,327	\$8,931,511	\$2,261,078
396	Second Block Rate							\$0	NA	NA	NA	NA
397	Summer Volumetric Rates											
398	First Block Rate	NA	\$16,148,297	\$392,294	NA	\$546,873	\$23,536	\$0	\$838,615	\$601,367	\$929,628	\$712,569
399	Second Block Rate							\$0	NA	NA	NA	NA
400	Demand Rate											
401	Winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
402	Summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
403	TOTAL BASE REVENUE		\$94,657,336	\$2,900,857		\$5,694,022	\$180,016	\$371	\$11,596,121	\$2,235,947	\$13,513,814	\$4,343,391
404												
405	<b><u>Class Bill Impacts</u></b>											
406												
407	Total Test Year Revenue	NA	\$304,180,734	\$24,486,381	NA	\$10,364,622	\$638,599	\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
408	Total Proposed Revenue	NA	\$313,045,895	\$23,257,193	NA	\$11,175,667	\$610,393	\$2,874	\$35,968,736	\$7,105,469	\$65,444,943	\$23,928,822
409												
410	Percent Change	NA	2.91%	-5.02%	NA	7.83%	-4.42%	2.49%	5.09%	7.10%	5.31%	6.77%



**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
DTE-05-27  
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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
377								
378	<b><u>Proposed Rates w/ Low Income Discount</u></b>							
379								
380	Monthly Customer Charge	\$213.00	\$213.00	\$781.00	\$781.00			line 324
381	Winter Volumetric Rates							
382	First Block Rate	\$0.1794	\$0.1682	\$0.0507	\$0.0507			line 326 + line 371
383	Second Block Rate							line 327 + line 371
384	Summer Volumetric Rates							
385	First Block Rate	\$0.0778	\$0.0657	\$0.0193	\$0.0193			line 329 + line 371
386	Second Block Rate							line 330 + line 371
387	Demand Rate							
388	Winter	NA	NA	\$2.1586	\$2.1586			line 332
389	Summer	NA	NA	\$0.6713	\$0.6713			line 333
390								
391	<b><u>Revenue Proof</u></b>							
392								
393	Monthly Customer Charge	\$1,583,016	\$636,657	\$141,361	\$624,019			line 27 * line 380
394	Winter Volumetric Rates							
395	First Block Rate	\$6,602,427	\$2,482,693	\$365,397	\$1,452,017			line 265 * line 382 or line 53 * line 382
396	Second Block Rate	NA	NA	NA	NA			line 269 * line 383
397	Summer Volumetric Rates							
398	First Block Rate	\$570,406	\$705,953	\$43,636	\$494,328			line 266 * line 385 or line 54 * line 385
399	Second Block Rate	NA	NA	NA	NA			line 270 * line 386
400	Demand Rate							
401	Winter	NA	NA	\$739,364	\$2,997,844			line 56 * line 388
402	Summer	NA	NA	\$69,320	\$795,411			line 57 * line 389
403	TOTAL BASE REVENUE	\$8,755,849	\$3,825,303	\$1,359,077	\$6,363,618		<b>\$155,425,723</b>	Sum lines 393 through 402
404								
405	<b><u>Class Bill Impacts</u></b>							
406								
407	Total Test Year Revenue	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 375
408	Total Proposed Revenue	\$49,772,669	\$27,130,313	\$10,186,224	\$55,774,106		\$623,403,304	line 197 + line 403
409								
410	Percent Change	6.87%	3.90%	6.88%	2.74%		<b>3.62%</b>	(line 408 - line 407) / line 407

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17b  
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line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
1	<b><u>Billing Determinants</u></b>						
2							
3	<b>Number of Bills</b>						
4	Total - Annual	2,666,494	2,450,273	216,221	400,515	380,501	20,014
5	Total - Winter	1,341,433	1,227,802	113,631	194,753	184,442	10,311
6	Total - Summer	1,325,061	1,222,471	102,590	205,762	196,059	9,703
7							
8	<b>First Block Therms</b>						
9	Total First Block - Winter	201,943,124	184,965,126	16,977,998	3,742,241	3,461,572	280,669
10	Total First Block- Summer	45,840,165	41,674,961	4,165,204	2,653,925	2,468,865	185,060
11							
12	<b>Second Block Therms</b>						
13	Total Second Block - Winter	0	0	0	0	0	0
14	Total Second Block- Summer	0	0	0	0	0	0
15							
16	<b><u>Proposed Rates (w/o Discount)</u></b>						
17							
18	Monthly Customer Charge		\$12.10	\$12.10		\$11.60	\$11.60
19	Winter Volumetric Rates						
20	First Block Rate		\$0.2499	\$0.2499		\$0.1688	\$0.1688
21	Second Block Rate	NA	NA		NA	NA	
22	Summer Volumetric Rates						
23	First Block Rate		\$0.3732	\$0.3732		\$0.1785	\$0.1785
24	Second Block Rate	NA	NA		NA	NA	
25							
26	<b><u>Resulting Base Revenue (w/o Discount)</u></b>						
27	Customer Charge	\$32,264,577	\$29,648,303	\$2,616,274	\$4,645,974	\$4,413,812	\$232,162
28	Winter Volumetric						
29	First Block	\$50,467,690	\$46,224,711	\$4,242,978	\$631,759	\$584,377	\$47,382
30	Second Block						
31	Summer Volumetric						
32	First Block	\$17,108,948	\$15,554,367	\$1,554,581	\$473,661	\$440,632	\$33,029
33	Second Block						
34	Total Base Revenue	\$99,841,215	\$91,427,382	\$8,413,834	\$5,751,394	\$5,438,821	\$312,573
35							

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17b  
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line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
36							
37	<b><u>Other Revenue (new rates)</u></b>						
38	Direct Gas Costs (new)	\$220,233,021	\$201,441,105	\$18,791,916	\$5,555,541	\$5,151,206	\$404,335
39	Indirect Gas Costs (new)	\$12,199,536	\$11,168,284	\$1,031,251	\$230,176	\$213,068	\$17,108
40	LDAC (new)	\$6,312,338	\$5,779,170	\$533,168	\$126,304	\$117,370	\$8,934
41	<b>Total Other Revenue (new)</b>	\$238,744,895	\$218,388,559	\$20,356,336	\$5,912,021	\$5,481,644	\$430,377
42							
43	TOTAL REVENUE	\$338,586,110	\$309,815,941	\$28,770,170	\$11,663,415	\$10,920,465	\$742,950
44							
45	20% Burnertip Low-Income Discount (1)			\$5,754,034			\$148,590
46							
47	Total Revenue after Discount	\$332,832,076			\$11,514,825		
48	Volumetric Surcharge (1)		\$0.0141			\$0.0426	
49	<b><u>Proposed Rates (w/ LI Surcharge) (1)</u></b>						
50							
51	Monthly Customer Charge		\$12.10			\$11.60	
52	Winter Volumetric Rates						
53	First Block Rate		\$0.2640			\$0.2114	
54	Second Block Rate						
55	Summer Volumetric Rates						
56	First Block Rate		\$0.3873			\$0.2210	
57	Second Block Rate						
58							
59	<b><u>Resulting Base Revenue (w/ LI Surcharge) (1)</u></b>						
60	Customer Charge		\$29,648,303	\$2,616,274		\$4,413,812	\$232,162
61	Winter Volumetric						
62	First Block		\$48,832,345	\$4,482,334		\$731,733	\$59,330
63	Second Block						
64	Summer Volumetric						
65	First Block		\$16,141,900	\$1,613,302		\$545,729	\$40,907
66	Second Block						
67	Total Base Revenue		\$94,622,548	\$8,711,910		\$5,691,274	\$332,399
68	TOTAL REVENUE	\$342,079,353	\$313,011,107	\$29,068,246	\$11,935,694	\$11,172,918	\$762,776
69	20% Burnertip Low-Income Discount (2)			\$5,813,649			\$152,555
70							

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17b  
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line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
71	Total Revenue after Discount	\$336,265,704			\$11,783,139		
72	Volumetric Surcharge (2)		\$0.0142			\$0.0430	
73							
74							
75	<b><u>Proposed Rates (w/ LI Surcharge) (2)</u></b>						
76							
77	Monthly Customer Charge		\$12.10			\$11.60	
78	Winter Volumetric Rates						
79	First Block Rate		\$0.2642			\$0.2118	
80	Second Block Rate						
81	Summer Volumetric Rates						
82	First Block Rate		\$0.3875			\$0.2215	
83	Second Block Rate						
84							
85	<b><u>Resulting Base Revenue (w/ LI Surcharge) (2)</u></b>						
86	Customer Charge		\$29,648,303	\$2,616,274		\$4,413,812	\$232,162
87	Winter Volumetric						
88	First Block		\$48,860,433	\$4,484,912		\$733,320	\$59,459
89	Second Block						
90	Summer Volumetric						
91	First Block		\$16,148,228	\$1,613,935		\$546,861	\$40,991
92	Second Block						
93	Total Base Revenue		\$94,656,965	\$8,715,121		\$5,693,993	\$332,612
94	TOTAL REVENUE	\$342,116,981	\$313,045,524	\$29,071,457	\$11,938,627	\$11,175,637	\$762,989
95	20% Burnertip Low-Income Discount (3)			\$5,814,291			\$152,598
96							
97	Total Revenue after Discount	\$336,302,689			\$11,786,029		
98	Volumetric Surcharge (3)		\$0.0143			\$0.0430	
99							

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17b  
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line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
100	<b><u>Proposed Rates (w/ LI Surcharge) (3)</u></b>						
101							
102	Monthly Customer Charge		\$12.10			\$11.60	
103	Winter Volumetric Rates						
104	First Block Rate		\$0.2642			\$0.2119	
105	Second Block Rate						
106	Summer Volumetric Rates						
107	First Block Rate		\$0.3875			\$0.2215	
108	Second Block Rate						
109							
110	<b><u>Resulting Base Revenue (w/ LI Surcharge) (3)</u></b>						
111	Customer Charge		\$29,648,303	\$2,616,274		\$4,413,812	\$232,162
112	Winter Volumetric						
113	First Block		\$48,860,736	\$4,484,940		\$733,337	\$59,460
114	Second Block						
115	Summer Volumetric						
116	First Block		\$16,148,297	\$1,613,942		\$546,873	\$40,992
117	Second Block						
118	Total Base Revenue		\$94,657,336	\$8,715,156		\$5,694,022	\$332,615
119	TOTAL REVENUE		\$313,045,895	\$29,071,491		\$11,175,667	\$762,992
120	20% Burnertip Low-Income Discount (4)			\$5,814,298			\$152,598
121	Proposed Base Revenue		\$94,657,336	\$2,900,857		\$5,694,022	\$180,016
122	Proposed Total Revenue		\$313,045,895	\$23,257,193		\$11,175,667	\$610,393
123							
124	<b><u>Proposed Low-Income Rates</u></b>						
125							
126	Proposed Monthly Customer Charge			\$6.25			\$6.25
127	Customer Charge Revenue			\$1,351,381			\$125,088
128							
129	Remaining Revenue Requirement			\$1,549,476			\$54,929
130							
131	ACS Seasonal Split						
132	Winter Percentage			74.68%			57.15%
133	Summer Percentage			25.32%			42.85%

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17b  
5 of 6

line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
134							
135	Volumetric Revenue Requirement						
136	Winter			\$1,157,182			\$31,392
137	Summer			\$392,294			\$23,536
138							
139	Unit Marginal Cost (\$ / winter therm)			\$0.1156			\$0.0652
140	Unit Marginal Cost (\$ / summer therm)			\$0.0640			\$0.0307
141	Ratio of Second Block to MC						
142	Winter			NA			NA
143	Summer			NA			NA
144							
145	Second Block Rate						
146	Winter			\$0.0682			\$0.1118
147	Summer			\$0.0942			\$0.1272
148							
149	Revenue Generated (all volumes)						
150	Winter			\$1,157,182			\$31,392
151	Summer			\$392,294			\$23,536
152							
153	Remaining Revenue			\$0			\$0
154	Winter			\$0			\$0
155	Summer			\$0			\$0
156							
157	First Block Surcharge						
158	Winter			\$0.0000			\$0.0000
159	Summer			\$0.0000			\$0.0000
160							
161	<b><u>Proposed Base Rates</u></b>						
162							
163	Monthly Customer Charge			\$6.25			\$6.25
164	Winter Volumetric Rates						
165	All Volumes			\$0.0682			\$0.1118
166							
167	Summer Volumetric Rates						
168	All Volumes			\$0.0942			\$0.1272

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-17b  
6 of 6

line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
169							
170							
171	<b><u>Resulting Base Revenue from LI Customers</u></b>						
172							
173	Monthly Customer Charge			\$1,351,381			\$125,088
174	Winter Volumetric Rates						
175	All Volumes			\$1,157,182			\$31,392
176							
177	Summer Volumetric Rates						
178	All Volumes			\$392,294			\$23,536
179							
180	TOTAL BASE REVENUE			\$2,900,857			\$180,016
181	Revenue Target			\$2,900,857			\$180,016

**BAY STATE GAS COMPANY**  
**Typical Residential Heating Bill (R-3)**

Line No.	Typical Usage In Therms										Total May - Apr (13)	Total Off-Peak (14)	Total Peak (15)																
	Residential Heating (R-3)																												
1															90	55	30	30	42	71	109	150	187	188	166	132	1,250	318	932
2	Current Base Rates																												
3	Off-Peak																												
4	Cust. Chg					\$7.47	\$7.47	\$7.47	\$7.47	\$7.47	\$7.47																		
5	First 30 therms @				\$0.2317	\$6.95	\$6.95	\$6.95	\$6.95	\$6.95	\$6.95																		
6	Excess 30 therms @				\$0.1639	\$9.83	\$4.10	\$0.00	\$0.00	\$1.97	\$6.72																		
7																													
8	Peak																												
9	Cust. Chg					\$7.47						\$7.47	\$7.47	\$7.47	\$7.47	\$7.47	\$7.47												
10	First 90 therms @				\$0.4000						\$36.00	\$36.00	\$36.00	\$36.00	\$36.00	\$36.00	\$36.00	\$45		\$45									
11	Excess 90 therms @				\$0.2076						\$3.94	\$12.46	\$20.14	\$20.35	\$15.78	\$8.72		\$81		\$81									
12																													
13	Revised Base Rates																												
14	Off-Peak																												
15	Cust. Chg					\$12.10	\$12.10	\$12.10	\$12.10	\$12.10	\$12.10	\$12.10																	
16	First 9999999 therms @				\$0.3875	\$34.88	\$21.31	\$11.63	\$11.63	\$16.28	\$27.51																		
17	Excess 9999999 therms @				\$0.0000	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00																		
18																													
19	Peak																												
20	Cust. Chg					\$12.10						\$12.10	\$12.10	\$12.10	\$12.10	\$12.10	\$12.10												
21	First 9999999 therms @				\$0.2642						\$28.80	\$39.63	\$49.41	\$49.67	\$43.86	\$34.87	\$73		\$73										
22	Excess 9999999 therms @				\$0.0000						\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$246		\$246										
23																													
24	Test Year Total Base Rate Amount					\$24.26	\$18.52	\$14.42	\$14.42	\$16.39	\$21.14	\$47.41	\$55.93	\$63.61	\$63.82	\$59.25	\$52.19	\$451	\$109	\$342									
25	Revised Total Base Rate Amount					\$46.98	\$33.41	\$23.73	\$23.73	\$28.38	\$39.61	\$40.90	\$51.73	\$61.51	\$61.77	\$55.96	\$46.97	\$515	\$196	\$319									
26																													
27	Test Year																												
28	CGA Rates - (Seasonal)					\$0.9143	\$0.9143	\$0.9143	\$0.9143	\$0.9143	\$0.9143	\$0.9640	\$0.9640	\$0.9640	\$0.9640	\$0.9640	\$0.9640												
29	LDAF					\$0.0156	\$0.0156	\$0.0156	\$0.0156	\$0.0156	\$0.0156	\$0.0137	\$0.0137	\$0.0137	\$0.0137	\$0.0137	\$0.0137												
30																													
31	Revised																												
32	CGA Rates - (Seasonal)					\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454												
33	LDAF					\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0251	\$0.0251	\$0.0251	\$0.0251	\$0.0251	\$0.0251												
34																													
35	Test Year					\$107.95	\$69.66	\$42.32	\$42.32	\$55.44	\$87.16	\$153.98	\$202.58	\$246.44	\$247.62	\$221.55	\$181.25	\$1,658	\$405	\$1,253									
36	Revised					\$130.92	\$84.71	\$51.71	\$51.71	\$67.55	\$105.83	\$146.68	\$197.31	\$242.99	\$244.22	\$217.06	\$175.08	\$1,716	\$492	\$1,223									
37	Difference					\$22.97	\$15.05	\$9.39	\$9.39	\$12.10	\$18.67	(\$7.30)	(\$5.28)	(\$3.45)	(\$3.40)	(\$4.49)	(\$6.17)	\$57	\$88	(\$30)									
38																													
39	% Chg					21.28%	21.60%	22.18%	22.18%	21.83%	21.42%	-4.74%	-2.60%	-1.40%	-1.37%	-2.02%	-3.40%	3.47%	21.63%	-2.40%									
40																													
41	Average monthly impact																						\$	4.79	\$	14.60	\$	(5.01)	



**BAY STATE GAS COMPANY**  
**Typical Residential Non-Heating Bill (R-1)**

**Typical Usage In Therms**

Line No.	Residential Non-Heating (R-1)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	Total May - Apr (13)	Total Off-Peak (14)	Total Peak (15)
1		17	17	15	14	7	15	15	18	19	20	19	19	195	85	110
2	<b>Current Base Rates</b>															
3	Off-Peak															
4	Cust. Chg	\$7.46	\$7.46	\$7.46	\$7.46	\$7.46	\$7.46							\$45	\$45	
5	First 10 therms @	\$0.3848	\$3.85	\$3.85	\$3.85	\$3.85	\$2.69	\$3.85						\$22	\$22	
6	Excess 10 therms @	\$0.2965	\$2.08	\$2.08	\$1.48	\$1.19	\$0.00	\$1.48						\$8	\$8	
7																
8	Peak															
9	Cust. Chg	\$7.46						\$7.46	\$7.46	\$7.46	\$7.46	\$7.46	\$7.46	\$45		\$45
10	First 12 therms @	\$0.4349						\$5.22	\$5.22	\$5.22	\$5.22	\$5.22	\$5.22	\$31		\$31
11	Excess 12 therms @	\$0.3758						\$1.13	\$2.26	\$2.63	\$3.01	\$2.63	\$2.63	\$14		\$14
12																
13	<b>Revised Base Rates</b>															
14	Off-Peak															
15	Cust. Chg	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60							\$70	\$70	
16	First 999999 therms @	\$0.2215	\$3.77	\$3.77	\$3.32	\$3.10	\$1.55	\$3.32						\$19	\$19	
17	Excess 999999 therms @	\$0.0000	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00						\$0	\$0	
18																
19	Peak															
20	Cust. Chg	\$11.60						\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$70		\$70
21	First 999999 therms @	\$0.2119						\$3.18	\$3.81	\$4.03	\$4.24	\$4.03	\$4.03	\$23		\$23
22	Excess 999999 therms @	\$0.0000						\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
23																
24	Test Year Total Base Rate Amount	\$13.38	\$13.38	\$12.79	\$12.49	\$10.15	\$12.79	\$13.81	\$14.93	\$15.31	\$15.69	\$15.31	\$15.31	\$165	\$75	\$90
25	Revised Total Base Rate Amount	\$15.37	\$15.37	\$14.92	\$14.70	\$13.15	\$14.92	\$14.78	\$15.41	\$15.63	\$15.84	\$15.63	\$15.63	\$181	\$88	\$93
26																
27	<b>Test Year</b>															
28	CGA Rates - (Seasonal)	\$0.8898	\$0.8898	\$0.8898	\$0.8898	\$0.8898	\$0.8898	\$0.8739	\$0.8739	\$0.8739	\$0.8739	\$0.8739	\$0.8739			
29	LDAF	\$0.0124	\$0.0124	\$0.0124	\$0.0124	\$0.0124	\$0.0124	\$0.0055	\$0.0055	\$0.0055	\$0.0055	\$0.0055	\$0.0055			
30																
31	<b>Revised</b>															
32	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
33	LDAF	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0169	\$0.0169	\$0.0169	\$0.0169	\$0.0169	\$0.0169			
34																
35	<b>Test Year</b>	\$28.72	\$28.72	\$26.32	\$25.12	\$16.47	\$26.32	\$27.00	\$30.76	\$32.02	\$33.27	\$32.02	\$32.02	\$339	\$152	\$187
36	<b>Revised</b>	<u>\$30.96</u>	<u>\$30.96</u>	<u>\$28.68</u>	<u>\$27.54</u>	<u>\$19.57</u>	<u>\$28.68</u>	<u>\$28.72</u>	<u>\$32.15</u>	<u>\$33.29</u>	<u>\$34.43</u>	<u>\$33.29</u>	<u>\$33.29</u>	<u>\$362</u>	<u>\$166</u>	<u>\$195</u>
37	<b>Difference</b>	\$2.23	\$2.23	\$2.35	\$2.41	\$3.10	\$2.35	\$1.72	\$1.38	\$1.27	\$1.16	\$1.27	\$1.27	\$23	\$15	\$8
38																
39	% Chg	7.78%	7.78%	8.94%	9.61%	18.83%	8.94%	6.39%	4.49%	3.96%	3.47%	3.96%	3.96%	6.72%	9.68%	4.31%
40																
41	Average monthly impact													\$ 1.90	\$ 2.45	\$ 1.34

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-18 Please redesign all the proposed residential rates to have a flat volumetric rate. Describe how these rates were developed. Provide all workpapers, calculations and assumptions. Include bill impact analyses (Schedule JAF 2-7) and working spreadsheet models.

Response: Please refer to Attachment AG-9-18a for a revised Schedule JAF-2-1, Attachment AG-9-18b for a revised Schedule JAF-2-5, and Attachment AG-9-18c for the bill impact analyses (Schedule JAF-2-7).

These residential rates were developed by using the same rate design principles that the Company used in allocating revenue requirement, including the capping of any class revenue increase at 6% until the allocation of the revenue shortfall associated with the residential low income discount rates. The Monthly Customer charges were also kept at the Company's proposed charges.

The steps used to develop the rates are shown on Attachment AG-9-18a. The redesigned rates for all residential customer classes are shown on page 15 of Attachment AG-9-18a. Attachment AG-9-18b was used to recalculate the discounted rates for low-income residential customers.

To design the rates as requested, the Company eliminated the first block surcharge and divided the volumetric revenue requirement for each residential customer class by total annual volumes.

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-18a  
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		Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (41) Med. Annual Low Winter
1	CURRENT BASE RATES											
2	Monthly Customer Charge		\$7.47	\$5.97		\$7.46	\$5.97	\$3.32	\$12.61	\$12.61	\$45.04	\$45.04
3	Winter Volumetric Rates											
4	First Block Rate		\$0.4000	\$0.2247		\$0.4349	\$0.2869		\$0.3694	\$0.3597	\$0.1979	\$0.1708
5	Second Block Rate		\$0.2076	\$0.0709		\$0.3758	\$0.2396		\$0.2315	\$0.2268	\$0.1572	\$0.1315
6	Summer Volumetric Rates											
7	First Block Rate		\$0.2317	\$0.1243		\$0.3848	\$0.2517		\$0.3288	\$0.3240	\$0.1246	\$0.1000
8	Second Block Rate		\$0.1639	\$0.0700		\$0.2965	\$0.1811		\$0.1855	\$0.1884	\$0.0988	\$0.0765
9	Demand Rate											
10	Winter											
11	Summer											
12												
13	First Block Size											
14	Winter		90	90		12	12		125	125	1,000	700
15	Summer		30	30		10	10		35	80	300	500
16												
17	TEST YEAR BILLING DETERMINANTS											
18	Number of Bills											
19	Sales Customers - Annual	2,666,054	2,449,833	216,221	400,456	380,442	20,014	144	190,903	35,847	43,826	15,250
20	Sales Customers - Winter	1,341,210	1,227,579	113,631	194,724	184,413	10,311	72	96,712	18,101	21,670	7,692
21	Sales Customers - Summer	1,324,844	1,222,254	102,590	205,732	196,029	9,703	72	94,191	17,746	22,156	7,558
22												
23	Transportation - Annual	440	440	0	59	59	0	0	9,303	4,061	12,369	5,823
24	Transportation - Winter	223	223	0	29	29	0	0	4,602	2,070	6,291	3,026
25	Transportation - Summer	217	217	0	30	30	0	0	4,701	1,991	6,078	2,797
26												
27	Total - Annual	2,666,494	2,450,273	216,221	400,515	380,501	20,014	144	200,206	39,908	56,195	21,073
28	Total - Winter	1,341,433	1,227,802	113,631	194,753	184,442	10,311	72	101,314	20,171	27,961	10,718
29	Total - Summer	1,325,061	1,222,471	102,590	205,762	196,059	9,703	72	98,892	19,737	28,234	10,355
30												
31	First Block Therms											
32	Sales Customers - Winter	107,074,126	98,497,478	8,576,648	1,687,563	1,604,160	83,403	1,395	8,836,019	1,240,429	17,789,142	4,608,855
33	Sales Customers - Summer	30,311,351	27,899,767	2,411,584	1,464,808	1,389,153	75,655	1,333	1,131,629	736,181	2,742,440	3,120,285
34												
35	Transportation Customers - Winter	18,105	18,105	0	306	306	0	0	505,134	155,589	5,568,728	1,960,146
36	Transportation Customers- Summer	5,269	5,269	0	265	265	0	0	89,954	98,920	1,118,124	1,236,700
37												
38	Total First Block - Winter	107,092,231	98,515,583	8,576,648	1,687,869	1,604,466	83,403	1,395	9,341,153	1,396,018	23,357,870	6,569,001
39	Total First Block- Summer	30,316,620	27,905,036	2,411,584	1,465,073	1,389,418	75,655	1,333	1,221,583	835,101	3,860,564	4,356,985
40												
41	Second Block Therms											
42	Sales Customers - Winter	94,806,098	86,404,748	8,401,350	2,053,651	1,856,385	197,266	0	12,040,801	1,371,743	15,722,941	3,507,671
43	Sales Customers - Summer	15,512,165	13,758,545	1,753,620	1,188,236	1,078,831	109,405	0	1,302,761	1,097,851	2,381,956	2,482,096
44												
45	Transportation Customers - Winter	44,795	44,795	0	721	721	0	0	1,115,993	342,115	7,439,176	2,664,232
46	Transportation Customers- Summer	11,380	11,380	0	616	616	0	0	188,945	201,158	1,398,085	1,789,398
47												
48	Total Second Block - Winter	94,850,893	86,449,543	8,401,350	2,054,372	1,857,106	197,266	0	13,156,794	1,713,858	23,162,117	6,171,903
49	Total Second Block- Summer	15,523,545	13,769,925	1,753,620	1,188,852	1,079,447	109,405	0	1,491,706	1,299,009	3,780,041	4,271,494
50												
51	Total Therms											
52	Total Therms - Annual	247,783,289	226,640,087	21,143,202	6,396,166	5,930,437	465,729	2,728	25,211,236	5,243,986	54,160,592	21,369,383
53	Total Therms - Winter	201,943,124	184,965,126	16,977,998	3,742,241	3,461,572	280,669	1,395	22,497,947	3,109,876	46,519,987	12,740,904
54	Total Therms - Summer	45,840,165	41,674,961	4,165,204	2,653,925	2,468,865	185,060	1,333	2,713,289	2,134,110	7,640,605	8,628,479
55	Peak Day Therms											
56	Total Peak Therms - Winter											
57	Total Peak Therms - Summer											

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-18a  
2 of 16

line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
1	<b>CURRENT BASE RATES</b>							
2	Monthly Customer Charge	\$109.37	\$109.37	\$298.53	\$298.53			
3	Winter Volumetric Rates							
4	First Block Rate	\$0.1658	\$0.1638	\$0.0389	\$0.0389			
5	Second Block Rate	\$0.1317	\$0.1288					
6	Summer Volumetric Rates							
7	First Block Rate	\$0.0687	\$0.0712	\$0.0170	\$0.0170			
8	Second Block Rate	\$0.0573	\$0.0569					
9	Demand Rate							
10	Winter			\$1.9787	\$1.9787			
11	Summer			\$0.8723	\$0.8723			
12								
13	First Block Size							
14	Winter	9,000	10,000					
15	Summer	2,200	8,000					
16								
17	<b>TEST YEAR BILLING DETERMINANTS</b>							
18	<b>Number of Bills</b>							
19	Sales Customers - Annual	3,331	1,100	61	91	0		Linked to Revenue File
20	Sales Customers - Winter	1,612	558	32	56	0		line 20 + line 21
21	Sales Customers - Summer	1,719	542	29	35	0		
22								
23	Transportation - Annual	4,101	1,889	120	708	60		line 24 + line 25
24	Transportation - Winter	2,050	972	60	354	30		
25	Transportation - Summer	2,051	917	60	354	30		
26								
27	Total - Annual	7,432	2,989	181	799	60	3,395,996	line 28 + line 29
28	Total - Winter	3,662	1,530	92	410	30	1,702,146	line 20 + line 24
29	Total - Summer	3,770	1,459	89	389	30	1,693,850	line 21 + line 25
30								
31	<b>First Block Therms</b>							
32	Sales Customers - Winter	10,546,755	3,147,730	3,128,697	2,286,988	0		
33	Sales Customers - Summer	1,723,995	2,077,886	1,303,249	867,009	0		
34								
35	Transportation Customers - Winter	14,755,633	7,257,566	4,082,507	26,368,965	68,058,131		
36	Transportation Customers- Summer	2,478,355	5,128,242	953,578	24,699,265	48,156,552		
37								
38	Total First Block - Winter	25,302,388	10,405,296	7,211,204	28,655,953	68,058,131		line 32 + line 35
39	Total First Block- Summer	4,202,350	7,206,128	2,256,827	25,566,274	48,156,552		line 33 + line 36
40								
41	<b>Second Block Therms</b>							
42	Sales Customers - Winter	4,052,965	656,853	0	0	0		
43	Sales Customers - Summer	1,159,973	783,422	0	0	0		
44								
45	Transportation Customers - Winter	7,451,026	3,694,479	0	0	0		
46	Transportation Customers- Summer	1,966,704	2,759,090	0	0	0		
47								
48	Total Second Block - Winter	11,503,991	4,351,332	0	0	0		line 42 + line 45
49	Total Second Block- Summer	3,126,677	3,542,512	0	0	0		line 43 + line 46
50								
51	<b>Total Therms</b>							
52	Total Therms - Annual	44,135,406	25,505,268	9,468,031	54,222,227	116,214,683	609,712,995	line 53 + line 54
53	Total Therms - Winter	36,806,379	14,756,628	7,211,204	28,655,953	68,058,131	446,043,769	line 38 + line 48
54	Total Therms - Summer	7,329,027	10,748,640	2,256,827	25,566,274	48,156,552	163,669,226	line 39 + line 49
55	<b>Peak Day Therms</b>							
56	Total Peak Therms - Winter			342,526	1,388,815			
57	Total Peak Therms - Summer			103,257	1,184,822			

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
58												
59	<b>TEST YEAR REVENUE AND AVERAGE RATES</b>											
60	<b>Base Revenue Proof</b>											
61	Customer Revenue											
62	Winter	\$9,850,058	\$9,171,681	\$678,377	\$1,437,494	\$1,375,937	\$61,557	\$239	\$1,277,570	\$254,356	\$1,259,363	\$482,739
63	Summer	\$9,744,321	\$9,131,858	\$612,462	\$1,520,527	\$1,462,600	\$57,927	\$239	\$1,247,028	\$248,884	\$1,271,659	\$466,389
64	Volumetric Revenue - First Block											
65	Winter	\$41,333,406	\$39,406,233	\$1,927,173	\$721,711	\$697,782	\$23,928	\$0	\$3,450,622	\$502,148	\$4,622,522	\$1,121,985
66	Summer	\$6,765,357	\$6,465,597	\$299,760	\$553,690	\$534,648	\$19,042	\$0	\$401,656	\$270,573	\$481,026	\$435,699
67	Volumetric Revenue - Second Block											
68	Winter	\$18,542,581	\$17,946,925	\$595,656	\$745,165	\$697,900	\$47,265	\$0	\$3,045,798	\$388,703	\$3,641,085	\$811,605
69	Summer	\$2,379,644	\$2,256,891	\$122,753	\$339,869	\$320,056	\$19,813	\$0	\$276,711	\$244,733	\$373,468	\$326,769
70	Demand Revenue											
71	Winter											
72	Summer											
73	Total Base Revenue											
74	Annual	\$88,615,366	\$84,379,185	\$4,236,181	\$5,318,457	\$5,088,924	\$229,532	\$478	\$9,699,385	\$1,909,397	\$11,649,124	\$3,645,186
75	Winter	\$69,726,045	\$66,524,839	\$3,201,206	\$2,904,370	\$2,771,620	\$132,750	\$239	\$7,773,989	\$1,145,207	\$9,522,971	\$2,416,329
76	Summer	\$18,889,322	\$17,854,346	\$1,034,976	\$2,414,087	\$2,317,304	\$96,783	\$239	\$1,925,396	\$764,190	\$2,126,154	\$1,228,857
77												
78	<b>Test Year Revenues Other Than Base</b>											
79	Direct Gas Adjustment Factor											
80	Winter	\$174,520,722	\$159,967,958	\$14,552,764	\$2,954,414	\$2,734,150	\$220,264	\$1,046	\$18,045,768	\$2,077,451	\$27,427,776	\$6,173,431
81	Summer	\$37,128,614	\$33,832,934	\$3,295,680	\$2,083,413	\$1,941,005	\$142,408	\$1,020	\$2,072,310	\$1,426,365	\$4,348,236	\$4,371,925
82	Indirect Gas Adjustment Factor											
83	Winter	\$10,654,378	\$9,770,054	\$884,324	\$140,140	\$129,799	\$10,341	\$46	\$1,042,083	\$119,382	\$1,627,923	\$320,877
84	Summer	\$2,625,689	\$2,387,022	\$238,667	\$153,346	\$142,650	\$10,696	\$79	\$136,326	\$106,741	\$299,777	\$329,979
85	Distribution Adjustment Factor											
86	Winter	\$2,770,292	\$2,543,322	\$226,970	\$20,423	\$19,096	\$1,327	\$2	\$264,368	\$37,414	\$549,519	\$157,285
87	Summer	\$715,107	\$650,130	\$64,977	\$32,908	\$30,614	\$2,294	\$6	\$55,351	\$43,536	\$155,868	\$176,021
88												
89	<b>Test Year Average Rates</b>											
90	Direct Gas Adjustment Factor											
91	Winter		\$0.8645	\$0.8645		\$0.7897	\$0.7897	\$0.7498	\$0.8644	\$0.7953	\$0.8184	\$0.7606
92	Summer		\$0.8103	\$0.8103		\$0.7853	\$0.7853	\$0.7652	\$0.8513	\$0.7777	\$0.8485	\$0.7804
93	Indirect Gas Adjustment Factor											
94	Winter		\$0.0528	\$0.0528		\$0.0375	\$0.0375	\$0.0330	\$0.0499	\$0.0457	\$0.0486	\$0.0395
95	Summer		\$0.0573	\$0.0573		\$0.0578	\$0.0578	\$0.0593	\$0.0560	\$0.0582	\$0.0585	\$0.0589
96	Distribution Adjustment Factor											
97	Winter		\$0.0137	\$0.0137		\$0.0055	\$0.0055	\$0.0014	\$0.0119	\$0.0119	\$0.0119	\$0.0119
98	Summer		\$0.0156	\$0.0156		\$0.0124	\$0.0124	\$0.0045	\$0.0204	\$0.0204	\$0.0204	\$0.0204
99	Deferred Gas Cost Factor											
100	Winter		\$0.0467	\$0.0467		\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467
101	Summer		\$0.0467	\$0.0467		\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467	\$0.0467
102												
103	<b>Imputed Gas Costs for Trans. Cust. (TY)</b>											
104	Direct Gas Adjustment Factor											
105	Winter	\$57,311	\$57,311	\$0	\$859	\$859	\$0	\$0	\$1,476,953	\$419,052	\$11,253,365	\$3,733,137
106	Summer	\$14,267	\$14,267	\$0	\$733	\$733	\$0	\$0	\$250,434	\$247,382	\$2,252,534	\$2,502,711
107	Indirect Gas Adjustment Factor											
108	Winter	\$3,320	\$3,320	\$0	\$38	\$38	\$0	\$0	\$80,920	\$22,746	\$631,887	\$182,819
109	Summer	\$954	\$954	\$0	\$51	\$51	\$0	\$0	\$15,618	\$17,465	\$147,198	\$178,237

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
DTE-05-27  
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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
58								
59	<b><u>TEST YEAR REVENUE AND AVERAGE RATES</u></b>							
60	<b><u>Base Revenue Proof</u></b>							
61	Customer Revenue							
62	Winter	\$400,513	\$167,336	\$27,465	\$122,397	\$1,673,238		line 2 * line 28
63	Summer	\$412,325	\$159,571	\$26,569	\$116,128	\$1,700,847		line 2 * line 29
64	Volumetric Revenue - First Block							
65	Winter	\$4,195,136	\$1,704,387	\$280,516	\$1,114,717	\$73,688		line 4 * line 38
66	Summer	\$288,701	\$513,076	\$38,366	\$434,627	\$54,492		line 7 * line 39
67	Volumetric Revenue - Second Block							
68	Winter	\$1,515,076	\$560,452					line 5 * line 48
69	Summer	\$179,159	\$201,569					line 8 * line 49
70	Demand Revenue							
71	Winter			\$677,756	\$2,748,048	\$0		line 10 * line 57
72	Summer			\$90,071	\$1,033,520	\$0		line 11 * line 58
73	Total Base Revenue							
74	Annual	\$6,990,909	\$3,306,391	\$1,140,743	\$5,569,437	\$3,502,265	\$141,347,140	line 75 + line 76
75	Winter	\$6,110,724	\$2,432,175	\$985,737	\$3,985,162	\$1,746,926	\$108,749,875	line 62 + line 65 + line 68 + line 71
76	Summer	\$880,185	\$874,216	\$155,006	\$1,584,275	\$1,755,339	\$32,597,265	line 63 + line 66 + line 69 + line 72
77								
78	<b><u>Test Year Revenues Other Than Base</u></b>							
79	Direct Gas Adjustment Factor						\$307,478,651	
80	Winter	\$11,386,539	\$2,931,479	\$2,283,880	\$1,820,147		\$249,622,653	
81	Summer	\$2,406,876	\$2,249,653	\$1,097,293	\$670,293		\$57,855,998	
82	Indirect Gas Adjustment Factor							
83	Winter	\$701,197	\$150,322	\$143,101	\$98,211		\$14,997,660	
84	Summer	\$172,174	\$176,541	\$77,805	\$53,494		\$4,131,951	
85	Distribution Adjustment Factor							
86	Winter	\$434,212	\$182,500	\$79,946	\$351,731		\$4,847,692	
87	Summer	\$149,511	\$219,272	\$46,039	\$521,551		\$2,115,170	
88								
89	<b><u>Test Year Average Rates</u></b>							
90	Direct Gas Adjustment Factor							Some classes are combined.
91	Winter	\$0.7711	\$0.7800	\$0.7711	\$0.7800			line 80 / (line 32 + line 42)
92	Summer	\$0.8369	\$0.7832	\$0.8369	\$0.7832			line 81 / (line 33 + line 43)
93	Indirect Gas Adjustment Factor							
94	Winter	\$0.0476	\$0.0408	\$0.0476	\$0.0408			line 83 / (line 32 + line 42)
95	Summer	\$0.0833	\$0.0682	\$0.0833	\$0.0682			line 84 / (line 33 + line 43)
96	Distribution Adjustment Factor							
97	Winter	\$0.0119	\$0.0119	\$0.0119	\$0.0119			line 86 / line 53
98	Summer	\$0.0204	\$0.0204	\$0.0204	\$0.0204			line 87 / line 54
99	Deferred Gas Cost Factor							
100	Winter	\$0.0467	\$0.0467	\$0.0467	\$0.0467			INPUT from COS
101	Summer	\$0.0467	\$0.0467	\$0.0467	\$0.0467			INPUT from COS
102								
103	<b><u>Imputed Gas Costs for Trans. Cust. (TY)</u></b>							Calculated using average rates and
104	Direct Gas Adjustment Factor							transportation volumes.
105	Winter	\$18,160,054	\$9,054,121	\$3,338,573	\$21,799,382		\$69,292,806	(line 91 + line 100) * (line 35 + line 45)
106	Summer	\$3,927,415	\$6,545,332	\$842,530	\$20,496,779		\$37,080,117	(line 92 + line 101) * (line 36 + line 46)
107	Indirect Gas Adjustment Factor							
108	Winter	\$1,057,570	\$446,838	\$194,425	\$1,075,840		\$3,696,404	line 94 * (line 35 + line 45)
109	Summer	\$370,188	\$538,074	\$79,415	\$1,684,985		\$3,032,185	line 95 * (line 36 + line 46)

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
110												
111	<b><u>Summary of TY Rev. w/ Imputed Gas Costs</u></b>											
112	Test Year Base Revenue											
113	Annual	\$88,615,366	\$84,379,185	\$4,236,181	\$5,318,457	\$5,088,924	\$229,532	\$478	\$9,699,385	\$1,909,397	\$11,649,124	\$3,645,186
114	Winter	\$69,726,045	\$66,524,839	\$3,201,206	\$2,904,370	\$2,771,620	\$132,750	\$239	\$7,773,989	\$1,145,207	\$9,522,971	\$2,416,329
115	Summer	\$18,889,322	\$17,854,346	\$1,034,976	\$2,414,087	\$2,317,304	\$96,783	\$239	\$1,925,396	\$764,190	\$2,126,154	\$1,228,857
116	Direct Cost of Gas Revenue											
117	Annual	\$211,720,914	\$193,872,470	\$17,848,444	\$5,039,419	\$4,676,747	\$362,672	\$2,066	\$21,845,465	\$4,170,250	\$45,281,911	\$16,781,203
118	Winter	\$174,578,033	\$160,025,269	\$14,552,764	\$2,955,273	\$2,735,009	\$220,264	\$1,046	\$19,522,721	\$2,496,503	\$38,681,141	\$9,906,568
119	Summer	\$37,142,881	\$33,847,201	\$3,295,680	\$2,084,146	\$1,941,738	\$142,408	\$1,020	\$2,322,744	\$1,673,747	\$6,600,770	\$6,874,636
120	Indirect Cost of Gas Revenue											
121	Annual	\$13,284,341	\$12,161,350	\$1,122,991	\$293,575	\$272,538	\$21,037	\$125	\$1,274,947	\$266,334	\$2,706,786	\$1,011,912
122	Winter	\$10,657,698	\$9,773,374	\$884,324	\$140,178	\$129,837	\$10,341	\$46	\$1,123,003	\$142,128	\$2,259,810	\$503,696
123	Summer	\$2,626,643	\$2,387,976	\$238,667	\$153,397	\$142,701	\$10,696	\$79	\$151,944	\$124,206	\$446,975	\$508,216
124	Deferred Gas Costs											
125	Annual	\$11,561,095	\$10,574,277	\$986,818	\$298,440	\$276,703	\$21,737	\$127	\$1,088,006	\$207,518	\$1,803,283	\$640,304
126	Winter	\$9,422,371	\$8,629,955	\$792,415	\$174,614	\$161,514	\$13,100	\$65	\$974,385	\$121,918	\$1,564,112	\$378,823
127	Summer	\$2,138,724	\$1,944,321	\$194,403	\$123,826	\$115,188	\$8,637	\$62	\$113,620	\$85,600	\$239,171	\$261,480
128	LDAC Revenue											
129	Annual	\$3,485,399	\$3,193,452	\$291,947	\$53,331	\$49,710	\$3,621	\$8	\$319,719	\$80,950	\$705,387	\$333,306
130	Winter	\$2,770,292	\$2,543,322	\$226,970	\$20,423	\$19,096	\$1,327	\$2	\$264,368	\$37,414	\$549,519	\$157,285
131	Summer	\$715,107	\$650,130	\$64,977	\$32,908	\$30,614	\$2,294	\$6	\$55,351	\$43,536	\$155,868	\$176,021
132	Total											
133	Annual	\$328,667,115	\$304,180,734	\$24,486,381	\$11,003,222	\$10,364,622	\$638,599	\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
134	Winter	\$267,154,438	\$247,496,759	\$19,657,679	\$6,194,858	\$5,817,077	\$377,782	\$1,398	\$29,658,467	\$3,943,170	\$52,577,553	\$13,362,701
135	Summer	\$61,512,677	\$56,683,974	\$4,828,702	\$4,808,363	\$4,547,546	\$260,818	\$1,406	\$4,569,056	\$2,691,279	\$9,568,938	\$9,049,209
136												
137	<b><u>COST STUDY INFORMATION</u></b>											
138												
139	Target ACS Base Revenue											
140	Annual	\$100,492,047			\$10,856,303			\$345	\$11,303,039	\$2,347,139	\$12,855,832	\$4,199,180
141	Winter	\$67,185,084			\$5,808,404			\$243	\$7,702,146	\$1,390,455	\$10,179,177	\$2,876,642
142	Summer	\$33,306,963			\$5,047,899			\$101	\$3,600,893	\$956,684	\$2,676,656	\$1,322,539
143												
144	Direct Gas Cost for New Rates											
145	Annual	\$220,161,443	\$201,369,526	\$18,791,916	\$5,553,949	\$5,149,614	\$404,335	\$2,374	\$20,721,910	\$3,861,651	\$34,343,363	\$11,913,936
146	Winter	\$179,486,460	\$164,391,763	\$15,094,697	\$3,213,507	\$2,972,427	\$241,080	\$1,198	\$18,561,038	\$2,243,719	\$29,794,722	\$6,971,671
147	Summer	\$40,674,983	\$36,977,763	\$3,697,220	\$2,340,442	\$2,177,187	\$163,255	\$1,176	\$2,160,872	\$1,617,932	\$4,548,641	\$4,942,265
148												
149	Indirect Gas Cost for New Rates											
150	Annual	\$12,195,262	\$11,164,011	\$1,031,251	\$230,087	\$212,979	\$17,108	\$90	\$1,219,427	\$160,448	\$1,979,482	\$497,484
151	Winter	\$11,365,857	\$10,409,995	\$955,861	\$200,903	\$185,831	\$15,072	\$75	\$1,175,365	\$140,274	\$1,886,730	\$435,857
152	Summer	\$829,406	\$754,015	\$75,390	\$29,183	\$27,148	\$2,036	\$15	\$44,062	\$20,174	\$92,752	\$61,626
153												
154	Direct Cost of Gas Rates (New)											
155	Winter	\$0.8891	\$0.8891	\$0.8891	\$0.8589	\$0.8589	\$0.8589	\$0.8589	\$0.8891	\$0.8589	\$0.8891	\$0.8589
156	Summer	\$0.8876	\$0.8876	\$0.8876	\$0.8822	\$0.8822	\$0.8822	\$0.8822	\$0.8876	\$0.8822	\$0.8876	\$0.8822
157	Indirect Cost of Gas Rates (New)											
158	Winter	\$0.0563	\$0.0563	\$0.0563	\$0.0537	\$0.0537	\$0.0537	\$0.0537	\$0.0563	\$0.0537	\$0.0563	\$0.0537
159	Summer	\$0.0181	\$0.0181	\$0.0181	\$0.0110	\$0.0110	\$0.0110	\$0.0110	\$0.0181	\$0.0110	\$0.0181	\$0.0110
160												
161	Target Customer Charge-MCOS	\$32.45			\$33.41				\$47.73	\$51.52	\$85.47	\$82.21
162	Target Customer Charge-ACS	\$23.30			\$24.22			\$0.61	\$34.63	\$42.57	\$82.80	\$89.22
163	Unit Marginal Cost (\$ / winter therm)	\$0.1156			\$0.0652			NA	\$0.1396	\$0.0683	\$0.1255	\$0.0643
164	Unit Marginal Cost (\$ / summer therm)	\$0.0640			\$0.0307			NA	\$0.0804	\$0.0324	\$0.0711	\$0.0306

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Annual High Winter	C&I (53) Ex. High Annual Low Winter	Special Contract	Company Total	Notes
110								
111	<b><u>Summary of TY Rev. w/ Imputed Gas Costs</u></b>							
112	Test Year Base Revenue							
113	Annual	\$6,990,909	\$3,306,391	\$1,140,743	\$5,569,437	\$3,502,265		line 114 + line 115
114	Winter	\$6,110,724	\$2,432,175	\$985,737	\$3,985,162	\$1,746,926		line 75
115	Summer	\$880,185	\$874,216	\$155,006	\$1,584,275	\$1,755,339		line 76
116	Direct Cost of Gas Revenue							
117	Annual	\$35,880,883	\$20,780,586	\$7,562,276	\$44,786,601		\$413,851,574	line 118 + line 119
118	Winter	\$29,546,593	\$11,985,600	\$5,622,453	\$23,619,529			line 80 + line 105
119	Summer	\$6,334,291	\$8,794,985	\$1,939,823	\$21,167,072			line 81 + line 106
120	Indirect Cost of Gas Revenue							
121	Annual	\$2,301,129	\$1,311,775	\$494,746	\$2,912,531		\$25,858,200	line 122 + line 123
122	Winter	\$1,758,767	\$597,160	\$337,526	\$1,174,051			line 83 + line 108
123	Summer	\$542,362	\$714,615	\$157,220	\$1,738,479			line 84 + line 109
124	Deferred Gas Costs							\$17,079,967
125	Annual	\$816,017	\$311,118	\$206,853	\$147,207		\$17,079,967	line 126 + line 127
126	Winter	\$681,414	\$177,572	\$146,026	\$106,741			line 100 * (line 32 + line 42)
127	Summer	\$134,604	\$133,546	\$60,827	\$40,466			line 101 * (line 33 + line 43)
128	LDAC Revenue							
129	Annual	\$583,723	\$401,772	\$125,985	\$873,282		\$6,962,862	line 130 + line 131
130	Winter	\$434,212	\$182,500	\$79,946	\$351,731			line 86
131	Summer	\$149,511	\$219,272	\$46,039	\$521,551			line 87
132	Total							
133	Annual	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 134 + line 135
134	Winter	\$38,531,710	\$15,375,007	\$7,171,688	\$29,237,214			line 114 + line 118 + line 122 + line 126 + line 130
135	Summer	\$8,040,952	\$10,736,635	\$2,358,915	\$25,051,843			line 115 + line 119 + line 123 + line 127 + line 131
136								
137	<b><u>COST STUDY INFORMATION</u></b>							
138								
139	Target ACS Base Revenue							
140	Annual	\$8,252,580	\$3,549,167	\$1,455,970	\$5,790,935	\$3,921,013	\$161,102,537	line 141 + line 142
141	Winter	\$6,953,781	\$2,626,714	\$1,284,399	\$4,397,478		\$110,404,524	without special contracts
142	Summer	\$1,298,798	\$922,452	\$171,571	\$1,393,457		\$50,698,013	without special contracts
143								
144	Direct Gas Cost for New Rates							
145	Annual	\$15,540,169	\$5,792,104	\$3,938,465	\$2,729,254		\$324,558,618	line 146 + line 147
146	Winter	\$12,980,232	\$3,267,937	\$2,781,643	\$1,964,403		\$261,266,529	
147	Summer	\$2,559,938	\$2,524,167	\$1,156,822	\$764,851		\$63,292,089	
148								
149	Indirect Gas Cost for New Rates							
150	Annual	\$874,164	\$235,780	\$199,734	\$132,348		\$17,724,307	line 151 + line 152
151	Winter	\$821,964	\$204,306	\$176,146	\$122,811		\$16,530,288	
152	Summer	\$52,200	\$31,474	\$23,589	\$9,537		\$1,194,018	
153								
154	Direct Cost of Gas Rates (New)							
155	Winter	\$0.8891	\$0.8589	\$0.8891	\$0.8589			line 146 / (line 32 + line 42)
156	Summer	\$0.8876	\$0.8822	\$0.8876	\$0.8822			line 147 / (line 33 + line 43)
157	Indirect Cost of Gas Rates (New)							
158	Winter	\$0.0563	\$0.0537	\$0.0563	\$0.0537			line 151 / (line 32 + line 42)
159	Summer	\$0.0181	\$0.0110	\$0.0181	\$0.0110			line 152 / (line 33 + line 43)
160								
161	Target Customer Charge-MCOS	\$351.39	\$355.73	\$1,001.16	\$906.18			Linked to COS Schedules
162	Target Customer Charge-ACS	\$261.13	\$307.22	\$799.10	\$762.87			
163	Unit Marginal Cost (\$ / winter therm)	\$0.1134	\$0.0543	\$0.1272	\$0.0618			
164	Unit Marginal Cost (\$ / summer therm)	\$0.0634	\$0.0254	\$0.0669	\$0.0272			



**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
165	<u>Imputed Gas Costs for Trans. Cust.</u>											
166	Direct Gas Adjustment Factor											
167	Winter	\$57,311	\$57,311	\$0	\$859	\$859	\$0	\$0	\$1,476,953	\$419,052	\$11,253,365	\$3,733,137
168	Summer	\$14,267	\$14,267	\$0	\$733	\$733	\$0	\$0	\$250,434	\$247,382	\$2,252,534	\$2,502,711
169	Indirect Gas Adjustment Factor											
170	Winter	\$3,320	\$3,320	\$0	\$38	\$38	\$0	\$0	\$80,920	\$22,746	\$631,887	\$182,819
171	Summer	\$954	\$954	\$0	\$51	\$51	\$0	\$0	\$15,618	\$17,465	\$147,198	\$178,237
172												
173	<u>Incremental LDAC Revenue</u>											
174												
175	Incremental LDAC Rate											
176	Winter	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114
177	Summer	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114	\$0.0114
178	Incremental LDAC Revenue											
179	Winter	\$2,303,953	\$2,110,252	\$193,701	\$42,695	\$39,493	\$3,202	\$16	\$256,677	\$35,480	\$530,743	\$145,360
180	Summer	\$522,987	\$475,466	\$47,520	\$30,278	\$28,167	\$2,111	\$15	\$30,956	\$24,348	\$87,171	\$98,442
181												
182	<u>Revenue Other Than Base (New)</u>											
183												
184	Direct Cost of Gas Revenue											
185	Annual	\$220,233,021	\$201,441,105	\$18,791,916	\$5,555,541	\$5,151,206	\$404,335	\$2,374	\$22,449,297	\$4,528,085	\$47,849,261	\$18,149,783
186	Winter	\$179,543,771	\$164,449,074	\$15,094,697	\$3,214,366	\$2,973,286	\$241,080	\$1,198	\$20,037,991	\$2,662,770	\$41,048,087	\$10,704,807
187	Summer	\$40,689,250	\$36,992,030	\$3,697,220	\$2,341,175	\$2,177,920	\$163,255	\$1,176	\$2,411,306	\$1,865,315	\$6,801,175	\$7,444,976
188	Indirect Cost of Gas Revenue											
189	Annual	\$12,199,536	\$11,168,284	\$1,031,251	\$230,176	\$213,068	\$17,108	\$90	\$1,315,966	\$200,659	\$2,758,567	\$858,539
190	Winter	\$11,369,176	\$10,413,315	\$955,861	\$200,942	\$185,870	\$15,072	\$75	\$1,256,285	\$163,020	\$2,518,618	\$618,677
191	Summer	\$830,360	\$754,969	\$75,390	\$29,234	\$27,199	\$2,036	\$15	\$59,681	\$37,639	\$239,950	\$239,863
192	LDAC Revenue											
193	Annual	\$6,312,338	\$5,779,170	\$533,168	\$126,304	\$117,370	\$8,934	\$39	\$607,352	\$140,778	\$1,323,301	\$577,108
194	Winter	\$5,074,245	\$4,653,574	\$420,671	\$63,118	\$58,589	\$4,529	\$18	\$521,045	\$72,894	\$1,080,262	\$302,645
195	Summer	\$1,238,094	\$1,125,596	\$112,497	\$63,186	\$58,781	\$4,405	\$21	\$86,307	\$67,884	\$243,039	\$274,463
196	Total											
197	Annual	\$238,744,895	\$218,388,559	\$20,356,336	\$5,912,021	\$5,481,644	\$430,377	\$2,503	\$24,372,615	\$4,869,522	\$51,931,130	\$19,585,430
198	Winter	\$195,987,192	\$179,515,963	\$16,471,229	\$3,478,425	\$3,217,744	\$260,681	\$1,291	\$21,815,321	\$2,898,685	\$44,646,966	\$11,626,129
199	Summer	\$42,757,703	\$38,872,596	\$3,885,107	\$2,433,596	\$2,263,900	\$169,696	\$1,212	\$2,557,294	\$1,970,838	\$7,284,164	\$7,959,301
200												
201	<u>REVENUE ALLOCATION</u>											
202												
203	Percent ACS Base Revenue											
204	Annual	62.38%			6.74%			0.0002%	7.02%	1.46%	7.98%	2.61%
205	Winter	60.85%			5.26%			0.0002%	6.98%	1.26%	9.22%	2.61%
206	Summer	65.70%			9.96%			0.0002%	7.10%	1.89%	5.28%	2.61%
207	Base Revenue Requirement											
208	Other Fees Increase											
209	Revenue Assigned to Special Contracts											
210												
211	Incremental LDAC	\$2,826,939			\$72,973			\$31	\$287,633	\$59,828	\$617,914	\$243,802
212	Remaining Revenue Requirement											
213	Target Allocation of Revenue Requirement	\$96,950,986			\$10,473,757			\$333	\$10,904,751	\$2,264,432	\$12,402,828	\$4,051,213
214	Base Revenue Increment											
215	Total Revenue											
216	Test Year Revenue	\$328,667,115			\$11,003,222			\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
217	Target Revenue	\$335,695,881			\$16,385,778			\$2,835	\$35,277,366	\$7,133,955	\$64,333,958	\$23,636,643
218	Increase at Target	\$7,028,766			\$5,382,556			\$31	\$1,049,844	\$499,506	\$2,187,467	\$1,224,732
219	Percent Increase at Target	2.14%			48.92%			1.10%	3.07%	7.53%	3.52%	5.46%

**Bay State Gas Company  
Rate Design**

Witness: J. A. Ferro  
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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
165	<u>Imputed Gas Costs for Trans. Cust.</u>						\$113,101,512	Hold Constant at Test Year Levels
166	Direct Gas Adjustment Factor						\$113,101,512	
167	Winter	\$18,160,054	\$9,054,121	\$3,338,573	\$21,799,382		\$69,292,806	line 105
168	Summer	\$3,927,415	\$6,545,332	\$842,530	\$20,496,779		\$37,080,117	line 106
169	Indirect Gas Adjustment Factor							
170	Winter	\$1,057,570	\$446,838	\$194,425	\$1,075,840		\$3,696,404	line 108
171	Summer	\$370,188	\$538,074	\$79,415	\$1,684,985		\$3,032,185	line 109
172								
173	<u>Incremental LDAC Revenue</u>						\$5,630,282	Exhibit BSG/JES-4
174								
175	Incremental LDAC Rate						\$0.0114	line 173 / (total therms-special contracts)
176	Winter	\$0.0114	\$0.0114	\$0.0114	\$0.0114			Company Total: line 175
177	Summer	\$0.0114	\$0.0114	\$0.0114	\$0.0114			
178	Incremental LDAC Revenue						\$5,630,282	check
179	Winter	\$419,921	\$168,357	\$82,272	\$326,933		\$4,312,407	line 53 * line 176
180	Summer	\$83,616	\$122,630	\$25,748	\$291,684		\$1,317,875	line 54 * line 177
181								
182	<u>Revenue Other Than Base (New)</u>							
183								
184	Direct Cost of Gas Revenue							
185	Annual	\$37,627,638	\$21,391,558	\$8,119,568	\$45,025,415		\$430,931,541	line 186 + line 187
186	Winter	\$31,140,285	\$12,322,059	\$6,120,216	\$23,763,785		\$330,559,335	line 146 + line 167
187	Summer	\$6,487,352	\$9,069,499	\$1,999,352	\$21,261,630		\$100,372,206	line 147 + line 168
188	Indirect Cost of Gas Revenue							
189	Annual	\$2,301,922	\$1,220,693	\$473,575	\$2,893,174		\$24,452,896	line 190 + line 191
190	Winter	\$1,879,534	\$651,144	\$370,571	\$1,198,652		\$20,226,692	line 151 + line 170
191	Summer	\$422,388	\$569,549	\$103,004	\$1,694,522		\$4,226,204	line 152 + line 171
192	LDAC Revenue							
193	Annual	\$1,087,260	\$692,760	\$234,005	\$1,491,899		\$12,593,144	line 194 + line 195
194	Winter	\$854,133	\$350,857	\$162,218	\$678,664		\$9,160,099	line 130 + line 179
195	Summer	\$233,127	\$341,902	\$71,787	\$813,235		\$3,433,045	line 131 + line 180
196	Total							
197	Annual	\$41,016,820	\$23,305,010	\$8,827,147	\$49,410,488		\$467,977,581	line 198 + line 199
198	Winter	\$33,873,952	\$13,324,060	\$6,653,005	\$25,641,101		\$359,946,127	line 186 + line 190 + line 194
199	Summer	\$7,142,868	\$9,980,950	\$2,174,142	\$23,769,387		\$108,031,454	line 187 + line 191 + line 195
200								
201	<u>REVENUE ALLOCATION</u>							
202								
203	Percent ACS Base Revenue							
204	Annual	5.12%	2.20%	0.90%	3.59%	NA	100.00%	line 140 / (company total - sp contracts)
205	Winter	6.30%	2.38%	1.16%	3.98%	NA	100.00%	line 141 / (company total - sp contracts)
206	Summer	2.56%	1.82%	0.34%	2.75%	NA	100.00%	line 142 / (company total - sp contracts)
207	Base Revenue Requirement						\$165,023,551	
208	Other Fees Increase						\$46,525	Schs. JAF-1-8, 1-10; Input
209	Revenue Assigned to Special Contracts					\$3,921,013	\$3,921,013	Test year plus allocated increase
210								
211	Incremental LDAC	\$503,537	\$290,988	\$108,020	\$618,617	\$0	\$5,630,282	line 179 + line 180
212	Remaining Revenue Requirement						\$155,425,730	line 208 - sum (lines 208, 209, and 211)
213	Target Allocation of Revenue Requirement	\$7,961,782	\$3,424,104	\$1,404,665	\$5,586,879		\$155,425,730	line 204 * Company Total line 212
214	Base Revenue Increment						\$17,580,855	line 213 -(Company Total:line 74-Contracts:line 74)
215	Total Revenue							
216	Test Year Revenue	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 133
217	Target Revenue	\$48,978,602	\$26,729,114	\$10,231,812	\$54,997,367		\$623,403,311	line 197 + line 213
218	Increase at Target	\$2,405,939	\$617,472	\$701,210	\$708,310		\$21,805,834	line 217 - line 216
219	Percent Increase at Target	5.17%	2.36%	7.36%	1.30%		3.62%	line 218 / line 216

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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
220	Revenue Increase Cap of 6%	\$19,720,027			\$660,193			\$168	\$2,053,651	\$398,067	\$3,728,789	\$1,344,715
221	Revenue to Re-allocate	NA			\$4,722,363			NA	NA	\$101,439	NA	NA
222												
223	Total Revenue to Re-allocate											
224	Test Year Revenue for Re-allocation	\$328,667,115			NA			\$2,804	\$34,227,522	NA	\$62,146,491	\$22,411,911
225	Percent Assignment	57.22%						0.00%	5.96%		10.82%	3.90%
226	First Re-allocation	\$2,834,024						\$24	\$295,136		\$535,875	\$193,253
227	Increase with First Re-allocation	\$9,862,790			\$660,193			\$55	\$1,344,980	\$398,067	\$2,723,343	\$1,417,985
228	Revenue to Re-allocate	none			none			none	none	none	none	\$73,271
229	Test Year Revenue for Re-allocation	\$328,667,115			NA			NA	\$34,227,522	NA	\$62,146,491	NA
230	Percent Assignment	65.03%							6.77%		12.30%	
231	Second Re-allocation	\$56,206							\$5,853		\$10,628	
232	Increase with Second Re-allocation	\$9,918,995			\$660,193			\$55	\$1,350,834	\$398,067	\$2,733,970	\$1,344,715
233	Revenue to Re-allocate	none			none			none	none	none	none	none
234												
235												
236												
237												
238												
239												
240	Change from Target Allocation	\$2,890,229			-\$4,722,363			\$24	\$300,990	-\$101,439	\$546,503	\$119,982
241												
242	Base Revenue Requirement	\$99,841,215			\$5,751,394			\$357	\$11,205,741	\$2,162,993	\$12,949,332	\$4,171,195
243	Total Revenue Requirement	\$338,586,110			\$11,663,415			\$2,860	\$35,578,356	\$7,032,515	\$64,880,461	\$23,756,625
244	Percent Increase	3.02%			6.00%			1.97%	3.95%	6.00%	4.40%	6.00%
245												
246												
247	<u>RATE DESIGN</u>											
248												
249	<u>Proposed Block Sizes</u>											
250												
251	First Block Size											
252	Winter		125	NA		12	NA	NA	NA	NA	NA	NA
253	Summer		30	NA		10	NA	NA	NA	NA	NA	NA
254												
255	Test Year Therms											
256	Annual	247,783,289	226,640,087	21,143,202	6,396,166	5,930,437	465,729	2,728	25,211,236	5,243,986	54,160,592	21,369,383
257	Winter	201,943,124	184,965,126	16,977,998	3,742,241	3,461,572	280,669	1,395	22,497,947	3,109,876	46,519,987	12,740,904
258	Summer	45,840,165	41,674,961	4,165,204	2,653,925	2,468,865	185,060	1,333	2,713,289	2,134,110	7,640,605	8,628,479
259												
260	Percent of Therms in Proposed 1st Block											
261	Winter	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
262	Summer	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
263												
264	Proposed First Block Therms											
265	Winter	201,943,124	184,965,126	16,977,998	3,742,241	3,461,572	280,669	1,395	22,497,947	3,109,876	46,519,987	12,740,904
266	Summer	45,840,165	41,674,961	4,165,204	2,653,925	2,468,865	185,060	1,333	2,713,289	2,134,110	7,640,605	8,628,479
267												
268	Proposed Second Block Therms											
269	Winter	0	0	0	0	0	0	0	0	0	0	0
270	Summer	0	0	0	0	0	0	0	0	0	0	0
271												
272	Base Revenue Requirement	\$99,841,215			\$5,751,394			\$357	\$11,205,741	\$2,162,993	\$12,949,332	\$4,171,195
273												

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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) High Ann. Low Winter	Ex. Special Contract	Company Total	Notes
220	Revenue Increase Cap of 6%	\$2,794,360	\$1,566,699	\$571,836	\$3,257,343			
221	Revenue to Re-allocate	NA	NA	\$129,374	NA			line 216 * 6%
222								line 218 - line 220
223	Total Revenue to Re-allocate						\$4,953,176	line 221 - line 222
224	Test Year Revenue for Re-allocation	\$46,572,662	\$26,111,642	NA	\$54,289,057		\$574,429,205	line 216
225	Percent Assignment	8.11%	4.55%		9.45%		100.00%	line 224 / Company Total line 224
226	First Re-allocation	\$401,586	\$225,155		\$468,123		\$4,953,176	line 225 * Company Total line 223
227	Increase with First Re-allocation	\$2,807,525	\$842,627	\$571,836	\$1,176,432		\$21,805,834	line 220 or line 226 + line 218
228	Revenue to Re-allocate	\$13,165	none	none	none		\$86,436	line 227 - line 220
229	Test Year Revenue for Re-allocation	NA	\$26,111,642	NA	\$54,289,057		\$505,441,827	line 224
230	Percent Assignment		5.17%		10.74%		100.00%	line 229 / Company Total line 229
231	Second Re-allocation		\$4,465		\$9,284		\$86,436	line 230 * Company Total line 228
232	Increase with Second Re-allocation	\$2,794,360	\$847,092	\$571,836	\$1,185,716		\$21,805,834	line 227 + line 231 or line 220
233	Revenue to Re-allocate	none	none	none	none		\$0	
234								
235								
236								
237								
238								
239								
240	Change from Target Allocation	\$388,420	\$229,620	-\$129,374	\$477,407		\$0	line 232 - line 218
241								
242	Base Revenue Requirement	\$8,350,202	\$3,653,724	\$1,275,292	\$6,064,285		\$155,425,730	line 213 + line 240
243	Total Revenue Requirement	\$49,367,022	\$26,958,734	\$10,102,439	\$55,474,773		\$623,403,311	line 217 + line 240
244	Percent Increase	6.00%	3.24%	6.00%	2.18%			(line 243 - line 216) / line 216
245								
246								
247	<u>RATE DESIGN</u>							
248								
249	<u>Proposed Block Sizes</u>							
250								
251	First Block Size							
252	Winter	NA	NA	NA	NA			See Ex. BSG/JAF-2; Schedule JAF-2-3
253	Summer	NA	NA	NA	NA			See Ex. BSG/JAF-2; Schedule JAF-2-3
254								
255	Test Year Therms							
256	Annual	44,135,406	25,505,268	9,468,031	54,222,227		493,498,312	line 257 + line 258
257	Winter	36,806,379	14,756,628	7,211,204	28,655,953			line 53
258	Summer	7,329,027	10,748,640	2,256,827	25,566,274			line 54
259								
260	Percent of Therms in Proposed 1st Block							See Ex. BSG/JAF-2; Schedule JAF-2-3
261	Winter	100.00%	100.00%	100.00%	100.00%			
262	Summer	100.00%	100.00%	100.00%	100.00%			
263								
264	Proposed First Block Therms							
265	Winter	36,806,379	14,756,628	7,211,204	28,655,953			line 257 * line 261
266	Summer	7,329,027	10,748,640	2,256,827	25,566,274			line 258 * line 262
267								
268	Proposed Second Block Therms							
269	Winter	0	0	0	0			
270	Summer	0	0	0	0			
271								
272	Base Revenue Requirement	\$8,350,202	\$3,653,724	\$1,275,292	\$6,064,285		\$155,425,730	line 242
273								

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		Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
274	Proposed Customer Charge	\$12.10			\$11.60			\$2.48	\$19.00	\$19.00	\$65.00	\$65.00
275	Customer Charge Revenue	\$32,264,577			\$4,645,974			\$357	\$3,803,914	\$758,252	\$3,652,675	\$1,369,745
276	Winter Customer Charge Revenue	\$16,231,339			\$2,259,135				\$1,924,966	\$383,249	\$1,817,465	\$696,670
277	Remaining Revenue	\$67,576,638			\$1,105,420			\$0	\$7,401,827	\$1,404,741	\$9,296,657	\$2,801,450
278	Summer Customer Charge Revenue	\$16,033,238			\$2,386,839							
279	Volumetric Revenue Requirement	\$67,576,638			\$1,105,420			\$0	\$7,401,827	\$1,404,741	\$9,296,657	\$2,801,450
280	Demand-Based Revenue Requirement	\$0			\$0			\$0	\$0	\$0	\$0	\$0
281	Average Volumetric Rate	\$0.2727			\$0.1728			\$0.0000	\$0.2936	\$0.2679	\$0.1716	\$0.1311
282	ACS Seasonal Split - Volumetric Req.											
283	Winter Percentage	74.68%			57.15%			70.64%	77.04%	63.39%	90.86%	77.05%
284	Summer Percentage	25.32%			42.85%			29.36%	22.96%	36.61%	9.14%	22.95%
285	Average Volumetric Rate - Winter	\$0.2499			\$0.1688			\$0.0000	\$0.2535	\$0.2863	\$0.1816	\$0.1694
286	Average Volumetric Rate - Summer	\$0.3732			\$0.1785			\$0.0000	\$0.6264	\$0.2410	\$0.1112	\$0.0745
287	Volumetric Revenue Requirement - Winter	\$50,467,690			\$631,759			\$0	\$5,702,223	\$890,474	\$8,446,662	\$2,158,410
288	Volumetric Revenue Requirement - Summer	\$17,108,948			\$473,661			\$0	\$1,699,604	\$514,267	\$849,994	\$643,040
289												
290	Unit Marginal Cost (\$ / winter therm)	\$0.1156			\$0.0652			NA	\$0.1396	\$0.0683	\$0.1255	\$0.0643
291	Unit Marginal Cost (\$ / summer therm)	\$0.0640			\$0.0307			NA	\$0.0804	\$0.0324	\$0.0711	\$0.0306
292	Ratio of Second Block to MC											
293	Winter	flat			flat			NA	flat	flat	flat	flat
294	Summer	flat			flat			NA	flat	flat	flat	flat
295												
296	Second Block Rate											
297	Winter	\$0.2727			\$0.1728			\$0.0000	\$0.2936	\$0.2679	\$0.1816	\$0.1694
298	Summer	\$0.2727			\$0.1728			\$0.0000	\$0.2936	\$0.2679	\$0.1112	\$0.0745
299												
300	Revenue Generated											
301	Annual	\$67,576,638			\$1,105,420			\$0	\$7,401,827	\$1,404,741	\$9,296,657	\$2,801,450
302	Winter	\$55,074,890			\$646,754			\$0	\$6,605,226	\$833,063	\$8,446,662	\$2,158,410
303	Summer	\$12,501,748			\$458,666			\$0	\$796,601	\$571,678	\$849,994	\$643,040
304												
305	Remaining Revenue											
306	Annual	\$0			\$0			\$0	\$0	\$0	\$0	\$0
307	Winter	-\$4,607,200			-\$14,995			\$0	\$0	\$0	\$0	\$0
308	Summer	\$4,607,200			\$14,995			\$0	\$0	\$0	\$0	\$0
309												
310	First Block Surcharge											
311	Winter	\$0.0000			\$0.0000			NA	NA	NA	NA	NA
312	Summer	\$0.0000			\$0.0000			NA	NA	NA	NA	NA
313												
314	Demand Charge Revenue Requirement											
315	Winter	NA			NA			NA	NA	NA	NA	NA
316	Summer	NA			NA			NA	NA	NA	NA	NA
317												
318	Demand Charge Rates											
319	Winter	NA			NA			NA	NA	NA	NA	NA
320	Summer	NA			NA			NA	NA	NA	NA	NA
321												

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		C&I (42)	C&I (52)	C&I (43)	C&I (53)	Ex.		
line	Description	High Annual High Winter	High Annual Low Winter	Ex. High Ann. High Winter	High Ann. Low Winter	Special Contract	Company Total	Notes
274	Proposed Customer Charge	\$213.00	\$213.00	\$781.00	\$781.00			See Ex. BSG/JAF-2; Schedule JAF-2-2
275	Customer Charge Revenue	\$1,583,016	\$636,657	\$141,361	\$624,019		\$49,480,547	line 274 * line 27
276	Winter Customer Charge Revenue	\$780,006	\$325,890	\$71,852	\$320,210			line 274 * line 28
277	Remaining Revenue	\$6,767,186	\$3,017,067	\$1,133,931	\$5,440,266		\$105,945,183	line 272 - line 275
278	Summer Customer Charge Revenue							
279	Volumetric Revenue Requirement	\$6,767,186	\$3,017,067	\$340,179	\$1,632,080			For 43 & 53, 30% of the remaining revenues
280	Demand-Based Revenue Requirement	\$0	\$0	\$793,751	\$3,808,186			are assigned to the volumetric charges.
281	Average Volumetric Rate	\$0.1533	\$0.1183	\$0.0359	\$0.0301			line 279 / line 256
282	ACS Seasonal Split - Volumetric Req.							
283	Winter Percentage	92.57%	79.00%	92.24%	78.91%			(line 141 - line 276) / (line 140 - line 275)
284	Summer Percentage	7.43%	21.00%	7.76%	21.09%			100% - line 283
285	Average Volumetric Rate - Winter	\$0.1702	\$0.1615	\$0.0435	\$0.0449			line 287 / line 257
286	Average Volumetric Rate - Summer	\$0.0686	\$0.0590	\$0.0117	\$0.0135			line 288 / line 258
287	Volumetric Revenue Requirement - Winter	\$6,264,141	\$2,383,423	\$313,769	\$1,287,891			line 283 * line 279
288	Volumetric Revenue Requirement - Summer	\$503,045	\$633,644	\$26,410	\$344,188			line 279 - line 287
289								
290	Unit Marginal Cost (\$ / winter therm)	\$0.1134	\$0.0543	\$0.1272	\$0.0618			line 163
291	Unit Marginal Cost (\$ / summer therm)	\$0.0634	\$0.0254	\$0.0669	\$0.0272			line 164
292	Ratio of Second Block to MC							
293	Winter	flat	flat	flat	flat			Inputs
294	Summer	flat	flat	flat	flat			
295								
296	Second Block Rate							
297	Winter	\$0.1702	\$0.1615	\$0.0447	\$0.0447			line 293 * line 290 or line 287 / line 53
298	Summer	\$0.0686	\$0.0590	\$0.0133	\$0.0133			line 294 * line 291 or line 288 / line 54
299								
300	Revenue Generated							
301	Annual	\$6,767,186	\$3,017,067	\$352,079	\$1,620,180			line 302 + line 303
302	Winter	\$6,264,141	\$2,383,423	\$322,019	\$1,279,642			line 257 * line 297
303	Summer	\$503,045	\$633,644	\$30,061	\$340,538			line 258 * line 298
304								
305	Remaining Revenue							
306	Annual	\$0	\$0	\$0	\$0			line 307 + line 308
307	Winter	\$0	\$0	\$0	\$0			line 287 - line 302
308	Summer	\$0	\$0	\$0	\$0			line 288 - line 303
309								
310	First Block Surcharge							
311	Winter	NA	NA	NA	NA			line 307 / line 265
312	Summer	NA	NA	NA	NA			line 308 / line 266
313								
314	Demand Charge Revenue Requirement							
315	Winter	NA	NA	\$732,127	\$3,005,080			line 280 * line 283
316	Summer	NA	NA	\$61,624	\$803,106			line 280 - line 315
317								
318	Demand Charge Rates							
319	Winter	NA	NA	\$2.1586	\$2.1586			line 315 / line 56
320	Summer	NA	NA	\$0.6713	\$0.6713			line 316 / line 57
321								

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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
322	<b><u>Base Rates w/o Low Inc. Discount</u></b>											
323												
324	Monthly Customer Charge	\$12.10			\$11.60			\$2.48	\$19.00	\$19.00	\$65.00	\$65.00
325	Winter Volumetric Rates											
326	First Block Rate	\$0.2727			\$0.1728			\$0.0	\$0.2936	\$0.2679	\$0.1816	\$0.1694
327	Second Block Rate	NA			NA			\$0.0	NA	NA	NA	NA
328	Summer Volumetric Rates											
329	First Block Rate	\$0.2727			\$0.1728			\$0.0	\$0.2936	\$0.2679	\$0.1112	\$0.0745
330	Second Block Rate	NA			NA			\$0.0	NA	NA	NA	NA
331	Demand Rate											
332	Winter	NA			NA			NA	NA	NA	NA	NA
333	Summer	NA			NA			NA	NA	NA	NA	NA
334												
335	<b><u>Revenue Generated</u></b>											
336	Monthly Customer Charge	\$32,264,577			\$4,645,974			\$357	\$3,803,914	\$758,252	\$3,652,675	\$1,369,745
337	Winter Volumetric Rates											
338	First Block Rate	\$55,074,890			\$646,754			NA	\$6,605,226	\$833,063	\$8,446,662	\$2,158,410
339	Second Block Rate	NA			NA			NA	NA	NA	NA	NA
340	Summer Volumetric Rates											
341	First Block Rate	\$12,501,748			\$458,666			NA	\$796,601	\$571,678	\$849,994	\$643,040
342	Second Block Rate	NA			NA			NA	NA	NA	NA	NA
343	Demand Rate											
344	Winter	NA			NA			NA	NA	NA	NA	NA
345	Summer	NA			NA			NA	NA	NA	NA	NA
346	TOTAL PROPOSED BASE REVENUE	\$99,841,215			\$5,751,394			\$357	\$11,205,741	\$2,162,993	\$12,949,332	\$4,171,195
347	check	\$0			\$0			\$0	\$0	\$0	\$0	\$0
348	<b><u>Class Bill Impacts</u></b>											
349	Total Test Year Revenue	\$328,667,115			\$11,003,222			\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
350	Total Proposed Revenue	\$338,586,110			\$11,663,415			\$2,860	\$35,578,356	\$7,032,515	\$64,880,461	\$23,756,625
351	check											
352	Percent Change	3.02%			6.00%			1.97%	3.95%	6.00%	4.40%	6.00%
353												
354												
355	<b><u>Allocation of Low-Income Discount</u></b>											
356	<b>Distribution Rate Base</b>	<b>\$228,590,466</b>			<b>\$17,817,354</b>			<b>\$948</b>	<b>\$25,270,507</b>	<b>\$4,722,501</b>	<b>\$36,540,684</b>	<b>\$11,146,787</b>
357	20% Burner-tip Discount Amount (1)			\$5,747,777			\$148,606					
358	Allocation Percentages	59.18%			4.61%			0.0002%	6.54%	1.22%	9.46%	2.89%
359	Amount Allocated (1)	\$3,489,549			\$271,991			\$14	\$385,767	\$72,091	\$557,812	\$170,161
360												
361	Volumetric Surcharge (1)	\$0.0141			\$0.0425			NA	\$0.0153	\$0.0137	\$0.0103	\$0.0080
362												
363	Revised Discount Amount (2)			\$5,807,329			\$152,567					
364	Amount Allocated (2)	\$3,527,137			\$274,921			\$15	\$389,922	\$72,868	\$563,821	\$171,994
365												
366	Volumetric Surcharge (2)	\$0.0142			\$0.0430			NA	\$0.0155	\$0.0139	\$0.0104	\$0.0080
367												
368	Revised Discount Amount (3)			\$5,807,971			\$152,609					
369	Amount Allocated (3)	\$3,527,542			\$274,952			\$15	\$389,967	\$72,876	\$563,885	\$172,014
370												
371	Volumetric Surcharge (3)	\$0.0142			\$0.0430			NA	\$0.0155	\$0.0139	\$0.0104	\$0.0080
372												
373	Proposed Base Revenue		\$94,685,205	\$2,875,574		\$5,693,674	\$180,063	\$371	\$11,595,708	\$2,235,869	\$13,513,217	\$4,343,209
374	Revised Total Revenue		\$313,073,764	\$23,231,910		\$11,175,318	\$610,439	\$2,874	\$35,968,323	\$7,105,392	\$65,444,347	\$23,928,639
375	Total Test Year Revenue		\$304,180,734	\$24,486,381		\$10,364,622	\$638,599	\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
376	Revised Percent Change		2.92%	-5.12%		7.82%	-4.41%	2.49%	5.09%	7.10%	5.31%	6.77%

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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
322	<b><u>Base Rates w/o Low Inc. Discount</u></b>							
323								
324	Monthly Customer Charge	\$213.00	\$213.00	\$781.00	\$781.00			line 274
325	Winter Volumetric Rates							
326	First Block Rate	\$0.1702	\$0.1615	\$0.0447	\$0.0447			line 311 + line 327 or line 297
327	Second Block Rate	NA	NA	NA	NA			line 297
328	Summer Volumetric Rates							
329	First Block Rate	\$0.0686	\$0.0590	\$0.0133	\$0.0133			line 312 + line 330 or line 298
330	Second Block Rate	NA	NA	NA	NA			line 298
331	Demand Rate							
332	Winter	NA	NA	\$2.1586	\$2.1586			line 319
333	Summer	NA	NA	\$0.6713	\$0.6713			line 320
334								
335	<b><u>Revenue Generated</u></b>							
336	Monthly Customer Charge	\$1,583,016	\$636,657	\$141,361	\$624,019			line 324* line 27
337	Winter Volumetric Rates							
338	First Block Rate	\$6,264,141	\$2,383,423	\$322,019	\$1,279,642			line 326 * line 265
339	Second Block Rate	NA	NA	NA	NA			line 327 * line 269
340	Summer Volumetric Rates							
341	First Block Rate	\$503,045	\$633,644	\$30,061	\$340,538			line 329 * line 266
342	Second Block Rate	NA	NA	NA	NA			line 330 * line 270
343	Demand Rate							
344	Winter	NA	NA	\$739,364	\$2,997,844			line 332 * line 56
345	Summer	NA	NA	\$69,320	\$795,411		\$0	line 333 * line 57
346	TOTAL PROPOSED BASE REVENUE	\$8,350,202	\$3,653,724	\$1,302,124	\$6,037,453		\$155,425,730	sum (lines 336 through 345)
347	check	\$0	\$0	\$26,832	-\$26,832			
348	<b><u>Class Bill Impacts</u></b>							
349	Total Test Year Revenue	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 133
350	Total Proposed Revenue	\$49,367,022	\$26,958,734	\$10,129,271	\$55,447,941		\$623,403,311	line 346 + line 197
351	check							
352	Percent Change	6.00%	3.24%	6.28%	2.13%			(line 350 - line 349) / line 349
353								
354								
355	<b><u>Allocation of Low-Income Discount</u></b>							
356	<b>Distribution Rate Base</b>	<b>\$26,258,806</b>	<b>\$11,106,815</b>	<b>\$4,945,453</b>	<b>\$19,854,998</b>		\$386,255,320	COS Input
357	20% Burner-tip Discount Amount (1)						\$5,896,383	Schedule JAF-2-5; line 45
358	Allocation Percentages	6.80%	2.88%	1.28%	5.14%		100.00%	line 356 / Company Total line 356
359	Amount Allocated (1)	\$400,854	\$169,551	\$75,495	\$303,097		\$5,896,383	line 358 * Company Total line 357
360								
361	Volumetric Surcharge (1)	\$0.0091	\$0.0066	\$0.0059	\$0.0059			line 359 / line 52
362								
363	Revised Discount Amount (2)						\$5,959,896	Schedule JAF-2-5; line 69
364	Amount Allocated (2)	\$405,172	\$171,377	\$76,308	\$306,361		\$5,959,896	line 358 * Company Total line 363
365								
366	Volumetric Surcharge (2)	\$0.0092	\$0.0067	\$0.0060	\$0.0060			line 364 / line 52
367								
368	Revised Discount Amount (3)						\$5,960,580	Schedule JAF-2-5; line 95
369	Amount Allocated (3)	\$405,218	\$171,397	\$76,317	\$306,397			line 358 * Company Total line 368
370								
371	Volumetric Surcharge (3)	\$0.0092	\$0.0067	\$0.0060	\$0.0060			line 369 / line 52
372								
373	Proposed Base Revenue	\$8,755,420	\$3,825,121	\$1,378,441	\$6,343,850		\$155,425,723	JAF-2-5; line 121 or line 346 + line 369
374	Revised Total Revenue	\$49,772,240	\$27,130,131	\$10,205,588	\$55,754,337		\$623,403,304	JAF-2-5; line 122 or line 350 + line 369
375	Total Test Year Revenue	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 349
376	Revised Percent Change	6.87%	3.90%	7.08%	2.70%			(line 374 - line 375) / line 375



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line	Description	Residential Heating Total	Residential Heating R&T-3	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Low Annual High Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter	C&I (51) Med. Annual Low Winter
377												
378	<b><u>Proposed Rates w/ Low Income Discount</u></b>											
379												
380	Monthly Customer Charge	NA	\$12.10	\$6.25	NA	\$11.60	\$6.25	\$2.58	\$19.00	\$19.00	\$65.00	\$65.00
381	Winter Volumetric Rates											
382	First Block Rate	NA	\$0.2870	\$0.0721	NA	\$0.2158	\$0.1180	\$0.0	\$0.3091	\$0.2818	\$0.1920	\$0.1775
383	Second Block Rate							\$0.0				
384	Summer Volumetric Rates											
385	First Block Rate	NA	\$0.2870	\$0.0721	NA	\$0.2158	\$0.1180	\$0.0	\$0.3091	\$0.2818	\$0.1217	\$0.0826
386	Second Block Rate							\$0.0				
387	Demand Rate											
388	Winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
389	Summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
390												
391	<b><u>Revenue Proof</u></b>											
392												
393	Monthly Customer Charge	NA	\$29,648,303	\$1,351,381	NA	\$4,413,812	\$125,088	\$371	\$3,803,914	\$758,252	\$3,652,675	\$1,369,745
394	Winter Volumetric Rates											
395	First Block Rate	NA	\$53,077,807	\$1,223,928	NA	\$747,050	\$33,130	\$0	\$6,953,224	\$876,281	\$8,930,998	\$2,260,969
396	Second Block Rate							\$0	NA	NA	NA	NA
397	Summer Volumetric Rates											
398	First Block Rate	NA	\$11,959,095	\$300,266	NA	\$532,812	\$21,845	\$0	\$838,570	\$601,336	\$929,543	\$712,495
399	Second Block Rate							\$0	NA	NA	NA	NA
400	Demand Rate											
401	Winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
402	Summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
403	TOTAL BASE REVENUE		\$94,685,205	\$2,875,574		\$5,693,674	\$180,063	\$371	\$11,595,708	\$2,235,869	\$13,513,217	\$4,343,209
404												
405	<b><u>Class Bill Impacts</u></b>											
406												
407	Total Test Year Revenue	NA	\$304,180,734	\$24,486,381	NA	\$10,364,622	\$638,599	\$2,804	\$34,227,522	\$6,634,448	\$62,146,491	\$22,411,911
408	Total Proposed Revenue	NA	\$313,073,764	\$23,231,910	NA	\$11,175,318	\$610,439	\$2,874	\$35,968,323	\$7,105,392	\$65,444,347	\$23,928,639
409												
410	Percent Change	NA	2.92%	-5.12%	NA	7.82%	-4.41%	2.49%	5.09%	7.10%	5.31%	6.77%

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line	Description	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Special Contract	Company Total	Notes
377								
378	<b><u>Proposed Rates w/ Low Income Discount</u></b>							
379								
380	Monthly Customer Charge	\$213.00	\$213.00	\$781.00	\$781.00			line 324
381	Winter Volumetric Rates							
382	First Block Rate	\$0.1794	\$0.1682	\$0.0507	\$0.0507			line 326 + line 371
383	Second Block Rate							line 327 + line 371
384	Summer Volumetric Rates							
385	First Block Rate	\$0.0778	\$0.0657	\$0.0193	\$0.0193			line 329 + line 371
386	Second Block Rate							line 330 + line 371
387	Demand Rate							
388	Winter	NA	NA	\$2.1586	\$2.1586			line 332
389	Summer	NA	NA	\$0.6713	\$0.6713			line 333
390								
391	<b><u>Revenue Proof</u></b>							
392								
393	Monthly Customer Charge	\$1,583,016	\$636,657	\$141,361	\$624,019			line 27 * line 380
394	Winter Volumetric Rates							
395	First Block Rate	\$6,602,070	\$2,482,588	\$365,351	\$1,451,835			line 265 * line 382 or line 53 * line 382
396	Second Block Rate	NA	NA	NA	NA			line 269 * line 383
397	Summer Volumetric Rates							
398	First Block Rate	\$570,335	\$705,876	\$43,622	\$494,165			line 266 * line 385 or line 54 * line 385
399	Second Block Rate	NA	NA	NA	NA			line 270 * line 386
400	Demand Rate							
401	Winter	NA	NA	\$739,364	\$2,997,844			line 56 * line 388
402	Summer	NA	NA	\$69,320	\$795,411			line 57 * line 389
403	TOTAL BASE REVENUE	\$8,755,420	\$3,825,121	\$1,359,017	\$6,363,273		<b>\$155,425,723</b>	Sum lines 393 through 402
404								
405	<b><u>Class Bill Impacts</u></b>							
406								
407	Total Test Year Revenue	\$46,572,662	\$26,111,642	\$9,530,603	\$54,289,057		\$601,597,478	line 375
408	Total Proposed Revenue	\$49,772,240	\$27,130,131	\$10,186,164	\$55,773,761		\$623,403,304	line 197 + line 403
409								
410	Percent Change	6.87%	3.90%	6.88%	2.73%		<b>3.62%</b>	(line 408 - line 407) / line 407

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-18b  
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line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
1	<b><u>Billing Determinants</u></b>						
2							
3	<b>Number of Bills</b>						
4	Total - Annual	2,666,494	2,450,273	216,221	400,515	380,501	20,014
5	Total - Winter	1,341,433	1,227,802	113,631	194,753	184,442	10,311
6	Total - Summer	1,325,061	1,222,471	102,590	205,762	196,059	9,703
7							
8	<b>First Block Therms</b>						
9	Total First Block - Winter	201,943,124	184,965,126	16,977,998	3,742,241	3,461,572	280,669
10	Total First Block- Summer	45,840,165	41,674,961	4,165,204	2,653,925	2,468,865	185,060
11							
12	<b>Second Block Therms</b>						
13	Total Second Block - Winter	0	0	0	0	0	0
14	Total Second Block- Summer	0	0	0	0	0	0
15							
16	<b><u>Proposed Rates (w/o Discount)</u></b>						
17							
18	Monthly Customer Charge		\$12.10	\$12.10		\$11.60	\$11.60
19	Winter Volumetric Rates						
20	First Block Rate		\$0.2727	\$0.2727		\$0.1728	\$0.1728
21	Second Block Rate	NA	NA		NA	NA	
22	Summer Volumetric Rates						
23	First Block Rate		\$0.2727	\$0.2727		\$0.1728	\$0.1728
24	Second Block Rate		NA	NA	NA	NA	
25							
26	<b><u>Resulting Base Revenue (w/o Discount)</u></b>						
27	Customer Charge	\$32,264,577	\$29,648,303	\$2,616,274	\$4,645,974	\$4,413,812	\$232,162
28	Winter Volumetric						
29	First Block	\$55,074,890	\$50,444,570	\$4,630,320	\$646,754	\$598,248	\$48,507
30	Second Block						
31	Summer Volumetric						
32	First Block	\$12,501,748	\$11,365,794	\$1,135,954	\$458,666	\$426,683	\$31,983
33	Second Block						
34	Total Base Revenue	\$99,841,215	\$91,458,667	\$8,382,549	\$5,751,394	\$5,438,742	\$312,652
35							

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-18b  
2 of 6

line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
36							
37	<b><u>Other Revenue (new rates)</u></b>						
38	Direct Gas Costs (new)	\$220,233,021	\$201,441,105	\$18,791,916	\$5,555,541	\$5,151,206	\$404,335
39	Indirect Gas Costs (new)	\$12,199,536	\$11,168,284	\$1,031,251	\$230,176	\$213,068	\$17,108
40	LDAC (new)	\$6,312,338	\$5,779,170	\$533,168	\$126,304	\$117,370	\$8,934
41	<b>Total Other Revenue (new)</b>	\$238,744,895	\$218,388,559	\$20,356,336	\$5,912,021	\$5,481,644	\$430,377
42							
43	TOTAL REVENUE	\$338,586,110	\$309,847,226	\$28,738,885	\$11,663,415	\$10,920,386	\$743,029
44							
45	20% Burnertip Low-Income Discount (1)			\$5,747,777			\$148,606
46							
47	Total Revenue after Discount	\$332,838,334			\$11,514,809		
48	Volumetric Surcharge (1)		\$0.0141			\$0.0425	
49	<b><u>Proposed Rates (w/ LI Surcharge) (1)</u></b>						
50							
51	Monthly Customer Charge		\$12.10			\$11.60	
52	Winter Volumetric Rates						
53	First Block Rate		\$0.2868			\$0.2153	
54	Second Block Rate						
55	Summer Volumetric Rates						
56	First Block Rate		\$0.2868			\$0.2153	
57	Second Block Rate						
58							
59	<b><u>Resulting Base Revenue (w/ LI Surcharge) (1)</u></b>						
60	Customer Charge		\$29,648,303	\$2,616,274		\$4,413,812	\$232,162
61	Winter Volumetric						
62	First Block		\$53,049,446	\$4,869,423		\$745,448	\$60,442
63	Second Block						
64	Summer Volumetric						
65	First Block		\$11,952,705	\$1,194,613		\$531,669	\$39,853
66	Second Block						
67	Total Base Revenue		\$94,650,455	\$8,680,310		\$5,690,928	\$332,457
68	TOTAL REVENUE	\$342,075,659	\$313,039,014	\$29,036,646	\$11,935,406	\$11,172,572	\$762,834
69	20% Burnertip Low-Income Discount (2)			\$5,807,329			\$152,567
70							

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-18b  
3 of 6

line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
71	Total Revenue after Discount	\$336,268,330			\$11,782,839		
72	Volumetric Surcharge (2)		\$0.0142			\$0.0430	
73							
74							
75	<b><u>Proposed Rates (w/ LI Surcharge) (2)</u></b>						
76							
77	Monthly Customer Charge		\$12.10			\$11.60	
78	Winter Volumetric Rates						
79	First Block Rate		\$0.2870			\$0.2158	
80	Second Block Rate						
81	Summer Volumetric Rates						
82	First Block Rate		\$0.2870			\$0.2158	
83	Second Block Rate						
84							
85	<b><u>Resulting Base Revenue (w/ LI Surcharge) (2)</u></b>						
86	Customer Charge		\$29,648,303	\$2,616,274		\$4,413,812	\$232,162
87	Winter Volumetric						
88	First Block		\$53,077,505	\$4,871,998		\$747,033	\$60,570
89	Second Block						
90	Summer Volumetric						
91	First Block		\$11,959,027	\$1,195,245		\$532,800	\$39,937
92	Second Block						
93	Total Base Revenue		\$94,684,835	\$8,683,517		\$5,693,644	\$332,670
94	TOTAL REVENUE	\$342,113,247	\$313,073,394	\$29,039,853	\$11,938,336	\$11,175,289	\$763,047
95	20% Burnertip Low-Income Discount (3)			\$5,807,971			\$152,609
96							
97	Total Revenue after Discount	\$336,305,277			\$11,785,726		
98	Volumetric Surcharge (3)		\$0.0142			\$0.0430	
99							

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-18b  
4 of 6

line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
100	<b><u>Proposed Rates (w/ LI Surcharge) (3)</u></b>						
101							
102	Monthly Customer Charge		\$12.10			\$11.60	
103	Winter Volumetric Rates						
104	First Block Rate		\$0.2870			\$0.2158	
105	Second Block Rate						
106	Summer Volumetric Rates						
107	First Block Rate		\$0.2870			\$0.2158	
108	Second Block Rate						
109							
110	<b><u>Resulting Base Revenue (w/ LI Surcharge) (3)</u></b>						
111	Customer Charge		\$29,648,303	\$2,616,274		\$4,413,812	\$232,162
112	Winter Volumetric						
113	First Block		\$53,077,807	\$4,872,026		\$747,050	\$60,572
114	Second Block						
115	Summer Volumetric						
116	First Block		\$11,959,095	\$1,195,252		\$532,812	\$39,938
117	Second Block						
118	Total Base Revenue		\$94,685,205	\$8,683,552		\$5,693,674	\$332,673
119	TOTAL REVENUE		\$313,073,764	\$29,039,888		\$11,175,318	\$763,049
120	20% Burnertip Low-Income Discount (4)			\$5,807,978			\$152,610
121	Proposed Base Revenue		\$94,685,205	\$2,875,574		\$5,693,674	\$180,063
122	Proposed Total Revenue		\$313,073,764	\$23,231,910		\$11,175,318	\$610,439
123							
124	<b><u>Proposed Low-Income Rates</u></b>						
125							
126	Proposed Monthly Customer Charge			\$6.25			\$6.25
127	Customer Charge Revenue			\$1,351,381			\$125,088
128							
129	Remaining Revenue Requirement			\$1,524,193			\$54,975
130							
131	ACS Seasonal Split						
132	Winter Percentage			74.68%			57.15%
133	Summer Percentage			25.32%			42.85%

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-18b  
5 of 6

line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
134							
135	Volumetric Revenue Requirement						
136	Winter			\$1,138,300			\$31,419
137	Summer			\$385,893			\$23,556
138							
139	Unit Marginal Cost (\$ / winter therm)			\$0.1156			\$0.0652
140	Unit Marginal Cost (\$ / summer therm)			\$0.0640			\$0.0307
141	Ratio of Second Block to MC						
142	Winter			NA			NA
143	Summer			NA			NA
144							
145	Second Block Rate						
146	Winter			\$0.0721			\$0.1180
147	Summer			\$0.0721			\$0.1180
148							
149	Revenue Generated (all volumes)						
150	Winter			\$1,223,928			\$33,130
151	Summer			\$300,266			\$21,845
152							
153	Remaining Revenue			\$0			\$0
154	Winter			-\$85,627			-\$1,712
155	Summer			\$85,627			\$1,712
156							
157	First Block Surcharge						
158	Winter			\$0.0000			\$0.0000
159	Summer			\$0.0000			\$0.0000
160							
161	<b><u>Proposed Base Rates</u></b>						
162							
163	Monthly Customer Charge			\$6.25			\$6.25
164	Winter Volumetric Rates						
165	All Volumes			\$0.0721			\$0.1180
166							
167	Summer Volumetric Rates						
168	All Volumes			\$0.0721			\$0.1180

**Bay State Gas Company**  
**Calculation of Residential Low-Income Discount**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-18b  
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line	Description	Residential Heating Total	Residential Heating 3 R&T-	Residential Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income
169							
170							
171	<b><u>Resulting Base Revenue from LI Customers</u></b>						
172							
173	Monthly Customer Charge			\$1,351,381			\$125,088
174	Winter Volumetric Rates						
175	All Volumes			\$1,223,928			\$33,130
176							
177	Summer Volumetric Rates						
178	All Volumes			\$300,266			\$21,845
179							
180	TOTAL BASE REVENUE			\$2,875,574			\$180,063
181	Revenue Target			\$2,875,574			\$180,063



**BAY STATE GAS COMPANY**  
**Typical Residential Heating Bill (R-3)**

Line No.		Typical Usage In Therms										Total		Total		Total	
		Residential Heating (R-3)						Nov	Dec	Jan	Feb	Mar	Apr	May - Apr	Off-Peak	Peak	
		May	Jun	Jul	Aug	Sep	Oct	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
		(1)	(2)	(3)	(4)	(5)	(6)										
1		90	55	30	30	42	71	109	150	187	188	166	132	1,250	318	932	
2	<b>Current Base Rates</b>																
3	Off-Peak																
4	Cust. Chg													\$45	\$45		
5	First 30 therms @	\$0.2317	\$6.95	\$6.95	\$6.95	\$6.95	\$6.95							\$42	\$42		
6	Excess 30 therms @	\$0.1639	\$9.83	\$4.10	\$0.00	\$0.00	\$1.97							\$23	\$23		
7																	
8	Peak																
9	Cust. Chg							\$7.47	\$7.47	\$7.47	\$7.47	\$7.47	\$7.47	\$45		\$45	
10	First 90 therms @	\$0.4000						\$36.00	\$36.00	\$36.00	\$36.00	\$36.00	\$36.00	\$216		\$216	
11	Excess 90 therms @	\$0.2076						\$3.94	\$12.46	\$20.14	\$20.35	\$15.78	\$8.72	\$81		\$81	
12																	
13	<b>Revised Base Rates</b>																
14	Off-Peak																
15	Cust. Chg													\$73	\$73		
16	First 1E+07 therms @	\$0.2870	\$25.83	\$15.79	\$8.61	\$8.61	\$12.05							\$91	\$91		
17	Excess 1E+07 therms @	\$0.0000	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0		
18																	
19	Peak																
20	Cust. Chg							\$12.10	\$12.10	\$12.10	\$12.10	\$12.10	\$12.10	\$73		\$73	
21	First 1E+07 therms @	\$0.2870						\$31.28	\$43.05	\$53.67	\$53.96	\$47.64	\$37.88	\$267		\$267	
22	Excess 1E+07 therms @	\$0.0000						\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0	
23																	
24	Test Year Total Base Rate Amount		\$24.26	\$18.52	\$14.42	\$14.42	\$16.39	\$21.14	\$47.41	\$55.93	\$63.61	\$63.82	\$59.25	\$52.19	\$451	\$109	\$342
25	Revised Total Base Rate Amount		\$37.93	\$27.89	\$20.71	\$20.71	\$24.15	\$32.48	\$43.38	\$55.15	\$65.77	\$66.06	\$59.74	\$49.98	\$504	\$164	\$340
26																	
27	<b>Test Year</b>																
28	CGA Rates - (Seasonal)		\$0.9143	\$0.9143	\$0.9143	\$0.9143	\$0.9143	\$0.9143	\$0.9640	\$0.9640	\$0.9640	\$0.9640	\$0.9640	\$0.9640			
29	LDAF		\$0.0156	\$0.0156	\$0.0156	\$0.0156	\$0.0156	\$0.0156	\$0.0137	\$0.0137	\$0.0137	\$0.0137	\$0.0137	\$0.0137			
30																	
31	<b>Revised</b>																
32	CGA Rates - (Seasonal)		\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454			
33	LDAF		\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0251	\$0.0251	\$0.0251	\$0.0251	\$0.0251	\$0.0251			
34																	
35	<b>Test Year</b>		\$107.95	\$69.66	\$42.32	\$42.32	\$55.44	\$87.16	\$153.98	\$202.58	\$246.44	\$247.62	\$221.55	\$181.25	\$1,658	\$405	\$1,253
36	<b>Revised</b>		<u>\$121.87</u>	<u>\$79.18</u>	<u>\$48.69</u>	<u>\$48.69</u>	<u>\$63.33</u>	<u>\$98.70</u>	<u>\$149.17</u>	<u>\$200.73</u>	<u>\$247.25</u>	<u>\$248.51</u>	<u>\$220.85</u>	<u>\$178.09</u>	<u>\$1,705</u>	<u>\$460</u>	<u>\$1,245</u>
37	<b>Difference</b>		\$13.93	\$9.52	\$6.37	\$6.37	\$7.88	\$11.53	(\$4.82)	(\$1.86)	\$0.82	\$0.89	(\$0.70)	(\$3.16)	\$47	\$56	(\$9)
38																	
39	% Chg		12.90%	13.67%	15.06%	15.06%	14.22%	13.23%	-3.13%	-0.92%	0.33%	0.36%	-0.32%	-1.74%	2.82%	13.74%	-0.70%
40																	
41	Average monthly impact														\$ 3.90	\$ 9.27	\$ (1.47)

**BAY STATE GAS COMPANY**  
**Typical Residential Non-Heating Bill (R-1)**

**Typical Usage In Therms**

Line No.	Residential Non-Heating (R-1)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	Total May - Apr (13)	Total Off-Peak (14)	Total Peak (15)
1		17	17	15	14	7	15	15	18	19	20	19	19	195	85	110
2	<b>Current Base Rates</b>															
3	Off-Peak															
4	Cust. Chg	\$7.46	\$7.46	\$7.46	\$7.46	\$7.46	\$7.46							\$45	\$45	
5	First 10 therms @	\$0.3848	\$3.85	\$3.85	\$3.85	\$3.85	\$2.69	\$3.85						\$22	\$22	
6	Excess 10 therms @	\$0.2965	\$2.08	\$2.08	\$1.48	\$1.19	\$0.00	\$1.48						\$8	\$8	
7																
8	Peak															
9	Cust. Chg	\$7.46						\$7.46	\$7.46	\$7.46	\$7.46	\$7.46	\$7.46	\$45		\$45
10	First 12 therms @	\$0.4349						\$5.22	\$5.22	\$5.22	\$5.22	\$5.22	\$5.22	\$31		\$31
11	Excess 12 therms @	\$0.3758						\$1.13	\$2.26	\$2.63	\$3.01	\$2.63	\$2.63	\$14		\$14
12																
13	<b>Revised Base Rates</b>															
14	Off-Peak															
15	Cust. Chg	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60							\$70	\$70	
16	First 999999 therms @	\$0.2158	\$3.67	\$3.67	\$3.24	\$3.02	\$1.51	\$3.24						\$18	\$18	
17	Excess 999999 therms @	\$0.0000	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00						\$0	\$0	
18																
19	Peak															
20	Cust. Chg	\$11.60						\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$70		\$70
21	First 999999 therms @	\$0.2158						\$3.24	\$3.88	\$4.10	\$4.32	\$4.10	\$4.10	\$24		\$24
22	Excess 999999 therms @	\$0.0000						\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
23																
24	Test Year Total Base Rate Amount	\$13.38	\$13.38	\$12.79	\$12.49	\$10.15	\$12.79	\$13.81	\$14.93	\$15.31	\$15.69	\$15.31	\$15.31	\$165	\$75	\$90
25	Revised Total Base Rate Amount	\$15.27	\$15.27	\$14.84	\$14.62	\$13.11	\$14.84	\$14.84	\$15.48	\$15.70	\$15.92	\$15.70	\$15.70	\$181	\$88	\$93
26																
27	<b>Test Year</b>															
28	CGA Rates - (Seasonal)	\$0.8898	\$0.8898	\$0.8898	\$0.8898	\$0.8898	\$0.8898	\$0.8739	\$0.8739	\$0.8739	\$0.8739	\$0.8739	\$0.8739			
29	LDAF	\$0.0124	\$0.0124	\$0.0124	\$0.0124	\$0.0124	\$0.0124	\$0.0055	\$0.0055	\$0.0055	\$0.0055	\$0.0055	\$0.0055			
30																
31	<b>Revised</b>															
32	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
33	LDAF	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0169	\$0.0169	\$0.0169	\$0.0169	\$0.0169	\$0.0169			
34																
35	<b>Test Year</b>	\$28.72	\$28.72	\$26.32	\$25.12	\$16.47	\$26.32	\$27.00	\$30.76	\$32.02	\$33.27	\$32.02	\$32.02	\$339	\$152	\$187
36	<b>Revised</b>	\$30.86	\$30.86	\$28.59	\$27.46	\$19.53	\$28.59	\$28.78	\$32.22	\$33.36	\$34.51	\$33.36	\$33.36	\$361	\$166	\$196
37	<b>Difference</b>	\$2.14	\$2.14	\$2.27	\$2.33	\$3.06	\$2.27	\$1.78	\$1.45	\$1.34	\$1.23	\$1.34	\$1.34	\$23	\$14	\$8
38																
39	% Chg	7.44%	7.44%	8.62%	9.29%	18.58%	8.62%	6.60%	4.72%	4.19%	3.71%	4.19%	4.19%	6.70%	9.36%	4.54%
40																
41	Average monthly impact													\$ 1.89	\$ 2.37	\$ 1.42

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-21      Refer to Exhibit BSG/JAF-2, Schedule JAF-2-9, Column (G). Please explain why an energy efficiency adjustment is a calculated percentage and not shown as therm value for each class and billing block?

Response:    Column G of Schedule JAF-2-9 is a percentage value as part of a rate table and as such does not show the therm savings deriving the percentage applicable to rates. The therm savings will be provided as support to the schedule showing the therm savings associated with the installation of energy efficiency measures, and then the calculation as set out in the footnote of Schedule JAF-2-9:  $[BD / (BD - EE \text{ therms})] - 1$ . Also, see response to AG-9-20.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-22      Refer to Schedule JAF-2-8, p. 3-341. According to the Company's proposed tariff, the ABRAM applies to firm sales and firm transportation Rate Schedules. Does that include special contract customers? If yes, has the Company notified all special contract customers of the proposed changes? Please provide copies of all such notices. If the Company does not intend to apply ABRAM to its special contract customers, please explain why.

Response:    No. The ABRAM does not apply to special contract customers, with the exception that the base rate percent increase associated with the PBR percent adjustment is applicable to one special contract customer pursuant to the contract. This customer has intervened in this proceeding. The Company needs to add this one "rate category" to the PBR section of the ABRAM calculation.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-24      Is the SIR Base Rate adjustment (Exhibit BSG/JAF-2, Schedule JAF-2-9, Column (C)) a cumulative amount?

Response:    Yes, the SIR Base Rate adjustment is a cumulative amount in that it represents rates associated with the cumulative annual revenue requirements in connection with each year of the SIR program.

Note that instead of adding each year's SIR Base Rate adjustment to the prior year's rates reflecting prior years' SIR adjustments, the prior years' cumulative SIR Base Rate adjustments are removed for each annual base rate adjustment, and the incremental base rate adjustment associated with the cumulative SIR revenue requirement is determined using the (current) prior year's billing determinants. The major reason for removing the prior year's SIR base rate adjustments is to ensure that the PBR adjustment is not applied to the component of base rates associated with the SIR increases.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-25      Please explain why the therm billing determinant appearing in Schedule JAF-2-9 are different from those in Schedule JAF-2-10. See R-3 head and tail block volumes. Should these be the same determinants? If not, why? See Exhibit BSG/JAF-2, p. 3-292, line23 through p. 3-293, line 2.

Response:    The volumetric therm billing determinants for the Residential Heating class appearing in Schedule JAF-2-9 inadvertently was not updated with the Company's proposed change in the winter head block size from 90 therms to 125 therms. Since this was a schedule for illustration purposes only, it does not affect the Company's proposal. The Company will ensure that this is corrected for any subsequent submittal of this schedule and for an actual ABRAM filing.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-29 Refer to Exhibit BSG/JAF-3, pp. 3-373-374. If the proposed interruptible tariff provisions had been in effect during the test year and the prior 2 years (2004, 2003 and 2002), what would these customers' revenues have been? Include all supporting documentation, workpapers, calculations and assumptions. Provide actual monthly bill determinants for each interruptible customer and identify the customer's class each customer would be in if not interruptible. Mask the identities of the customers.

Response: The proposed tariff changes would not change the value-of-service pricing terms of the agreement, nor would it change the classification of these customers from interruptible to firm. Thus, the rates would be generally the same as they have been. Considering that the proposed tariff provides for a distinct curtailment period of December through March, any interruptible revenues for that period would be eliminated. However, because very little sales were made during these months the revenue would be only slightly less. Attachment AG-9-29 presents the monthly volumes (MMBtu) and revenues of every interruptible customer for January, February, March and December 2002, 2003 and 2004. This schedule shows that, if all customers were curtailed from December through March, interruptible revenues would be reduced by the following:

Dec. 02 – March 03: \$492,836

Dec. 03 – March 04: \$496,574

Dec. 04 – March 05: \$169,588

Please note that if these sales and associated revenues were not made, the Company would also have avoided the gas costs associated with these sales. Such gas costs offset most of the revenues.

BAY STATE GAS COMPANY  
Interruptible Sales Volumes and Billed Revenues  
Proposed Curtailment Period of December - March

Attachment AG-9-29  
Page 1 of 3

	DEC., 2002		JAN., 2003		FEB., 2003		MARCH, 2003		4-Months
	TOTAL INVOICE		TOTAL INVOICE		TOTAL INVOICE		TOTAL INVOICE		Dec. - Mar.
	BILLED	(INCLUDING)	BILLED	(INCLUDING)	BILLED	(INCLUDING)	BILLED	(INCLUDING)	TOTAL INVOICE
CUSTOMER No.	SALES/MMBtu	CUST. CHARGE	SALES/MMBtu	CUST. CHARGE	SALES/MMBtu	CUST. CHARGE	SALES/MMBtu	CUST. CHARGE	(incl Cust Chg)
									(Revenues)
<b><u>BROCKTON DIV.</u></b>									
1	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
2	2,385.0	\$17,920.28	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$17,920.28
3	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
4	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
5	4,113.0	\$30,993.90	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$30,993.90
6	343.4	\$2,590.95	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$2,590.95
7	1,334.5	\$10,368.00	61.9	\$939.89	43.3	\$2,219.73	41.5	\$1,711.25	\$15,238.87
8	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
9	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
10	832.7	\$6,391.65	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$6,391.65
11	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
12	0.0	\$0.00	1,775.0	\$26,951.60	216.7	\$11,108.91	0.0	\$0.00	\$38,060.51
13	4,481.1	\$33,754.65	198.1	\$3,007.95	0.0	\$0.00	0.0	\$0.00	\$36,762.60
14	3,575.4	\$26,961.90	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$26,961.90
15	0.0	\$0.00	51.6	\$783.49	0.0	\$0.00	0.0	\$0.00	\$783.49
16	907.7	\$6,954.15	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$6,954.15
17	0.0	\$0.00	13.4	\$203.47	0.0	\$0.00	0.0	\$0.00	\$203.47
18	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
19	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
20	3,330.7	\$25,126.65	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$25,126.65
21	0.0	\$0.00	457.2	\$6,942.12	116.6	\$5,977.38	53.9	\$2,222.57	\$15,142.07
22	0.0	\$0.00	113.5	\$1,723.38	0.0	\$0.00	0.0	\$0.00	\$1,723.38
23	11.3	\$231.15	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$231.15
24	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
<b>Brockton Total</b>	<b>21,314.8</b>	<b>\$161,293.28</b>	<b>2,670.7</b>	<b>\$40,551.90</b>	<b>376.6</b>	<b>\$19,306.02</b>	<b>95.4</b>	<b>\$3,933.82</b>	<b>\$225,085.02</b>
<b><u>SPRINGFIELD DIV.</u></b>									
1	149.6	\$1,137.45	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$1,137.45
2	131.8	\$1,134.90	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$1,134.90
3	12.9	\$109.68	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$109.68
4	1,904.8	\$14,432.40	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$14,432.40
5	656.1	\$4,953.53	0.0	\$0.00	57.7	\$2,957.93	0.0	\$0.00	\$7,911.46
6	82.5	\$867.45	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$867.45
7	693.9	\$5,350.65	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$5,350.65
8	517.1	\$4,024.65	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$4,024.65
9	212.6	\$1,627.28	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$1,627.28
10	71.1	\$548.70	56.6	\$859.41	0.0	\$0.00	0.0	\$0.00	\$1,408.11
11	1,074.2	\$8,202.90	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$8,202.90
12	237.6	\$1,814.78	135.4	\$2,055.91	0.0	\$0.00	0.0	\$0.00	\$3,870.69
13	519.2	\$4,040.40	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$4,040.40
14	2,559.1	\$19,339.65	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$19,339.65
15	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
16	16.4	\$269.40	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$269.40
17	2,727.7	\$20,604.15	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$20,604.15
18	5,161.1	\$38,854.65	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$38,854.65
19	10.2	\$222.90	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$222.90
20	38.8	\$437.40	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$437.40
21	481.8	\$4,013.58	137.8	\$2,092.36	143.2	\$7,341.00	76.3	\$3,146.23	\$16,593.17
22	4,423.2	\$33,320.40	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$33,320.40
23	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
24	45.0	\$483.90	0.0	\$0.00	0.0	\$0.00	24.7	\$1,018.50	\$1,502.40
25	470.1	\$4,997.74	145.4	\$2,207.75	58.7	\$3,009.20	0.0	\$0.00	\$10,214.69
26	912.9	\$6,879.53	0.0	\$0.00	13.4	\$686.94	0.0	\$0.00	\$7,566.47
27	85.7	\$4,516.99	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$4,516.99
<b>Springfield Total</b>	<b>23,195.4</b>	<b>\$182,185.06</b>	<b>475.2</b>	<b>\$7,215.43</b>	<b>273.0</b>	<b>\$13,995.07</b>	<b>101.0</b>	<b>\$4,164.73</b>	<b>\$207,560.29</b>
<b><u>LAWRENCE DIV.</u></b>									
1	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
2	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
3	38.7	\$323.03	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$323.03
4	7,962.9	\$59,868.15	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$59,868.15
<b>Lawrence Total</b>	<b>8,001.6</b>	<b>\$60,191.18</b>	<b>0.0</b>	<b>\$0.00</b>	<b>0.0</b>	<b>\$0.00</b>	<b>0.0</b>	<b>\$0.00</b>	<b>\$60,191.18</b>
<b>BSG Total Sales</b>	<b>52,511.8</b>	<b>\$403,669.52</b>	<b>3,145.9</b>	<b>\$47,767.33</b>	<b>649.6</b>	<b>\$33,301.09</b>	<b>196.4</b>	<b>\$8,098.55</b>	<b>\$492,836.49</b>



DEC., 2003			JAN., 2004		FEB., 2004		MARCH, 2004		Dec. - Mar. 4-Months
CUSTOMER No.	TOTAL INVOICE (INCLUDING) BILLED (SALES/MMBtu CUST. CHARGE)		TOTAL INVOICE (INCLUDING) BILLED (SALES/MMBtu CUST. CHARGE)		TOTAL INVOICE (INCLUDING) BILLED (SALES/MMBtu CUST. CHARGE)		TOTAL INVOICE (INCLUDING) BILLED (SALES/MMBtu CUST. CHARGE)		TOTAL INVOICE (incl Cust Chg) (Revenues)
	SALES/MMBtu	CUST. CHARGE	SALES/MMBtu	CUST. CHARGE	SALES/MMBtu	CUST. CHARGE	SALES/MMBtu	CUST. CHARGE	
<b>BROCKTON DIV.</b>									
1	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
2	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
3	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
4	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
5	0.0	\$0.00	0.0	\$0.00	18.6	\$956.04	0.0	\$0.00	\$956.04
6	908.3	\$7,753.33	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$7,753.33
7	56.7	\$628.35	103.6	\$5,518.77	60.9	\$2,295.32	0.0	\$0.00	\$8,442.44
8	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
9	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
10	0.0	\$0.00	103.1	\$868.10	0.0	\$0.00	0.0	\$0.00	\$868.10
11	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
12	175.3	\$1,373.50	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$1,373.50
13	1,149.6	\$9,918.00	2,941.2	\$154,677.71	0.0	\$0.00	0.0	\$0.00	\$164,595.71
14	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
15	0.0	\$0.00	104.6	\$5,442.34	0.0	\$0.00	0.0	\$0.00	\$5,442.34
16	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
17	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
18	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
19	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
20	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
21	20.6	\$176.98	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$176.98
22	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
23	43.3	\$514.45	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$514.45
<b>Brockton Total</b>	<b>2,353.8</b>	<b>\$20,364.61</b>	<b>3,252.5</b>	<b>\$166,506.92</b>	<b>79.5</b>	<b>\$3,251.36</b>	<b>0.0</b>	<b>\$0.00</b>	<b>\$190,122.89</b>
<b>SPRINGFIELD DIV.</b>									
1	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
2	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
3	28.1	\$251.78	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$251.78
4	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
5	610.0	\$4,416.40	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$4,416.40
6	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
7	658.9	\$5,747.05	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$5,747.05
8	18.4	\$161.58	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$161.58
9	408.0	\$3,500.78	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$3,500.78
10	93.3	\$825.83	43.8	\$1,298.23	0.0	\$0.00	0.0	\$0.00	\$2,124.06
11	1,158.7	\$8,257.30	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$8,257.30
12	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
13	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
14	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
15	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
16	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
17	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
18	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
19	89.8	\$796.08	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$796.08
20	4,645.1	\$36,378.18	117.9	\$5,824.26	66.5	\$2,419.94	73.5	\$2,180.01	\$46,802.39
21	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
22	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
23	80.5	\$709.90	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$709.90
24	0.0	\$0.00	187.3	\$13,064.18	52.2	\$2,002.39	22.4	\$659.01	\$15,725.58
25	2,573.0	\$21,759.68	297.6	\$20,757.60	45.1	\$1,730.04	138.7	\$4,080.55	\$48,327.87
26	0.0	\$0.00	833.5	\$6,397.71	58.2	\$641.07	0.0	\$0.00	\$7,038.78
<b>Springfield Total</b>	<b>10,363.8</b>	<b>\$82,804.56</b>	<b>1,480.1</b>	<b>\$47,341.98</b>	<b>222.0</b>	<b>\$6,793.44</b>	<b>234.6</b>	<b>\$6,919.57</b>	<b>\$143,859.55</b>
<b>LAWRENCE DIV.</b>									
1	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
2	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
3	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00
4	18,854.6	\$160,410.50	41.7	\$2,180.91	0.0	\$0.00	0.0	\$0.00	\$162,591.41
<b>Lawrence Total</b>	<b>18,854.6</b>	<b>\$160,410.50</b>	<b>41.7</b>	<b>\$2,180.91</b>	<b>0.0</b>	<b>\$0.00</b>	<b>0.0</b>	<b>\$0.00</b>	<b>\$162,591.41</b>
<b>BSG Total Sales</b>	<b>31,572.2</b>	<b>\$263,579.67</b>	<b>4,774.3</b>	<b>\$216,029.81</b>	<b>301.5</b>	<b>\$10,044.80</b>	<b>234.6</b>	<b>\$6,919.57</b>	<b>\$496,573.85</b>

		DEC., 2004		JAN., 2005		FEB., 2005		MARCH, 2005		4-Months
CUSTOMER No.	TOTAL INVOICE BILLED (INCLUDING) SALES/MMBtu CUST. CHARGE		TOTAL INVOICE BILLED (INCLUDING) SALES/MMBtu CUST. CHARGE		TOTAL INVOICE BILLED (INCLUDING) SALES/MMBtu CUST. CHARGE		TOTAL INVOICE BILLED (INCLUDING) SALES/MMBtu CUST. CHARGE		Dec. - Mar. TOTAL INVOICE (incl Cust Chg) (Revenues)	
BROCKTON DIV.										
1	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
2	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
3	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
4	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
5	2,110.9	\$20,581.28	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$20,581.28	
6	192.0	\$2,018.40	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$2,018.40	
7	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
8	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
9	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
10	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
11	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
12	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
13	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
14	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
15	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
16	5.3	(\$1,974.75)	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	(\$1,974.75)	
17	213.2	\$3,572.13	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$3,572.13	
18	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
19	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
20	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
21	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
22	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
23	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$0.00	
Brockton Total	2,521.4	\$24,197.06	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$24,197.06	
SPRINGFIELD DIV.										
1	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
2	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
3	146.00	\$1,680.86	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$1,680.86	
4	272.60	\$2,865.03	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$2,865.03	
5	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
6	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
7	114.40	\$1,148.18	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$1,148.18	
8	38.30	\$417.98	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$417.98	
9	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
10	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
11	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
12	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
13	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
14	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
15	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
16	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
17	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
18	1,554.00	\$15,151.50	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$15,151.50	
19	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
20	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
21	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
22	4,046.90	\$40,615.11	2,114.90	\$37,156.95	625.10	\$6,396.92	2,213.90	\$18,964.88	\$103,133.86	
Springfield Total	6,172.20	\$61,878.66	2,114.90	\$37,156.95	625.10	\$6,396.92	2,213.90	\$18,964.88	\$124,397.41	
LAWRENCE DIV.										
1	1.00	\$9.75	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$9.75	
2	3.10	\$30.23	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$30.23	
3	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$0.00	
4	2,134.10	\$20,953.88	0.00	\$0.00	0.00	\$0.00	0.00	\$0.00	\$20,953.88	
Lawrence Total	2,138.2	\$20,993.86	0.0	\$0.00	0.0	\$0.00	0.0	\$0.00	\$20,993.86	
BSG Total Sales	10,831.8	\$107,069.58	2,114.9	\$37,156.95	625.1	\$6,396.92	2,213.9	\$18,964.88	\$169,588.33	

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-30 Please provide the monthly test year revenue for each interruptible customer had each customer been served under the appropriate firm tariff. Please mask the identity of each customer, but identify each in a manner consistent with the identifiers used in the above response. Include all supporting documentation, workpapers, calculations and assumptions.

Response: Attachment AG-9-30 (a) presents the monthly test year base revenue of each interruptible sales customer, using each customer's monthly gas use in 2004 and applying the G/T-52, Commercial and Industrial High Annual, Low Peak Period, rate schedule. Attachment AG-9-30 (b) shows the actual monthly therms in 2004 of each customer.

**CONFIDENTIAL**  
**Bay State Gas Company**

Witness: J. A. Ferro  
DTE-05-27  
Attachment AG-9-30 (a)

	January 04	February 04	March 04	April 04	May 04	June 04	July 04	August 04	September 04	October 04	November 04	December 04	Annual 2004
<b><u>CUSTOMER No.</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>	<b><u>52 -Bill</u></b>
<b><u>BROCKTON DIV.</u></b>													
1	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,312.44
2	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,312.44
3	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,312.44
4	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,312.44
5	\$109.37	\$139.84	\$109.37	\$16,159.45	\$3,392.70	\$3,422.23	\$3,734.50	\$2,465.91	\$2,357.12	\$4,841.03	\$16,038.63	\$3,178.21	\$55,948.37
6	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$251.77	\$399.79	\$485.59	\$1,662.36	\$423.87	\$3,988.97
7	\$279.07	\$209.12	\$109.37	\$109.37	\$109.37	\$109.37	\$139.77	\$648.35	\$1,516.03	\$1,760.41	\$2,217.23	\$109.37	\$7,316.84
8	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$447.78	\$806.37	\$1,042.39	\$788.79	\$1,202.74	\$109.37	\$5,053.66
9	\$109.37	\$109.37	\$109.37	\$862.52	\$425.50	\$247.07	\$109.37	\$109.37	\$132.30	\$721.47	\$205.03	\$109.37	\$3,250.11
10	\$278.25	\$109.37	\$109.37	\$1,946.62	\$1,701.98	\$1,295.88	\$780.54	\$867.20	\$861.62	\$2,651.24	\$826.98	\$109.37	\$11,538.40
11	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$118.98	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,322.05
12	\$109.37	\$109.37	\$109.37	\$708.88	\$109.37	\$514.78	\$846.31	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$3,054.30
13	\$4,247.64	\$109.37	\$109.37	\$2,643.82	\$1,421.06	\$1,618.10	\$2,001.44	\$1,754.49	\$1,523.71	\$1,834.27	\$1,501.67	\$109.37	\$18,874.31
14	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$464.80	\$109.37	\$2,898.53	\$7,528.31	\$263.18	\$109.37	\$12,029.77
15	\$280.70	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$166.47	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,540.88
16	\$109.37	\$109.37	\$109.37	\$852.37	\$256.75	\$539.56	\$729.61	\$2,688.34	\$2,603.90	\$1,128.65	\$7,979.10	\$118.05	\$17,224.44
17	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$116.25	\$458.59	\$1,668.54
18	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$188.62	\$1,245.52	\$1,355.11	\$1,612.93	\$849.04	\$3,273.78	\$109.37	\$9,181.22
19	\$109.37	\$109.37	\$109.37	\$109.37	\$1,248.48	\$4,873.58	\$2,318.60	\$109.37	\$309.30	\$313.93	\$109.37	\$109.37	\$9,829.48
20	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$116.25	\$109.37	\$1,319.32
21	\$109.37	\$109.37	\$109.37	\$159.98	\$485.23	\$116.77	\$922.05	\$325.53	\$176.01	\$182.42	\$400.12	\$109.37	\$3,205.60
22	\$109.37	\$109.37	\$109.37	\$126.24	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$121.33	\$109.37	\$1,341.27
23	\$109.37	\$109.37	\$109.37	\$3,188.26	\$181.57	\$516.28	\$227.99	\$109.37	\$139.70	\$177.44	\$963.59	\$109.37	\$5,941.67
<b><u>SPRINGFIELD DIV.</u></b>													
1	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$116.41	\$109.37	\$1,319.48
2	\$109.37	\$109.37	\$109.37	\$109.37	\$467.08	\$1,139.58	\$1,186.75	\$971.21	\$1,042.11	\$109.37	\$109.37	\$109.37	\$5,572.30
3	\$109.37	\$109.37	\$109.37	\$124.77	\$115.71	\$115.49	\$109.37	\$110.87	\$112.43	\$113.21	\$3,812.03	\$109.37	\$5,051.36
4	\$109.37	\$109.37	\$109.37	\$144.42	\$768.82	\$1,688.38	\$1,785.62	\$1,583.85	\$1,917.40	\$1,577.19	\$2,148.84	\$348.52	\$12,291.14
5	\$109.37	\$109.37	\$109.37	\$868.75	\$214.60	\$109.37	\$109.37	\$109.37	\$290.08	\$1,799.41	\$555.89	\$4,494.31	
6	\$109.37	\$109.37	\$109.37	\$111.17	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,314.24
7	\$109.37	\$109.37	\$109.37	\$182.75	\$362.56	\$348.39	\$238.24	\$243.37	\$336.64	\$508.52	\$838.28	\$109.37	\$3,496.23
8	\$109.37	\$109.37	\$109.37	\$181.11	\$189.19	\$346.18	\$287.87	\$267.86	\$284.81	\$442.30	\$267.60	\$109.37	\$2,704.40
9	\$109.37	\$109.37	\$109.37	\$424.85	\$153.66	\$117.99	\$109.37	\$109.37	\$117.27	\$207.20	\$1,523.95	\$296.76	\$3,388.52
10	\$181.11	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$130.09	\$110.52	\$172.11	\$1,468.79
11	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$581.93	\$109.37	\$1,785.00
12	\$109.37	\$109.37	\$109.37	\$120.67	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$116.09	\$109.37	\$1,330.46
13	\$109.37	\$109.37	\$109.37	\$1,331.15	\$652.77	\$531.16	\$544.12	\$512.86	\$522.90	\$821.45	\$237.46	\$109.37	\$5,591.35
14	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$2,854.15	\$109.37	\$4,057.22
15	\$109.37	\$109.37	\$109.37	\$109.37	\$258.11	\$134.57	\$109.37	\$109.37	\$165.48	\$146.82	\$5,958.10	\$109.37	\$7,428.67
16	\$109.37	\$109.37	\$109.37	\$354.74	\$196.45	\$109.37	\$109.37	\$109.37	\$109.37	\$425.78	\$1,301.02	\$109.37	\$3,152.95
17	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,312.44
18	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,289.73	\$926.71	\$883.70	\$1,077.21	\$2,305.29	\$185.86	\$109.37	\$7,324.73
19	\$109.37	\$109.37	\$109.37	\$1,569.28	\$1,569.28	\$1,569.28	\$1,597.51	\$1,275.79	\$1,359.38	\$1,818.56	\$8,423.59	\$109.37	\$18,041.62
20	\$302.49	\$218.30	\$229.76	\$181.11	\$224.00	\$398.01	\$109.37	\$109.37	\$109.37	\$127.38	\$109.37	\$109.37	\$2,227.92
21	\$109.37	\$109.37	\$109.37	\$1,040.74	\$1,688.95	\$1,059.06	\$1,022.82	\$996.53	\$1,277.73	\$2,037.51	\$3,334.44	\$2,460.92	\$15,246.81
22	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$184.23	\$109.37	\$1,387.30
23	\$109.37	\$109.37	\$109.37	\$109.37	\$3,670.15	\$109.37	\$109.37	\$109.37	\$676.76	\$6,316.05	\$2,667.39	\$109.37	\$14,205.31
24	\$416.17	\$194.87	\$146.06	\$142.79	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$1,774.85
25	\$596.84	\$183.24	\$336.56	\$109.37	\$109.37	\$109.37	\$487.66	\$109.37	\$133.08	\$116.56	\$109.37	\$109.37	\$2,510.16
26	\$1,474.64	\$204.70	\$109.37	\$491.52	\$305.60	\$1,004.10	\$1,706.30	\$1,273.18	\$1,108.62	\$711.97	\$109.37	\$5,671.78	\$14,171.14
<b><u>LAWRENCE DIV.</u></b>													
1	\$109.37	\$109.37	\$109.37	\$129.85	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$111.01	\$1,334.55
2	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$109.37	\$114.45	\$1,317.52
3	\$109.37	\$109.37	\$109.37	\$155.40	\$128.74	\$114.57	\$109.37	\$109.37	\$421.51	\$109.37	\$109.37	\$109.37	\$1,695.17
4	\$177.67	\$109.37	\$109.37	\$17,755.79	\$1,750.34	\$1,020.37	\$818.94	\$478.54	\$1,571.11	\$15,111.54	\$43,132.10	\$3,208.09	\$85,243.24
Grand Total	\$12,937.49	\$6,290.47	\$6,180.88	\$53,342.71	\$24,772.97	\$27,281.72	\$27,799.65	\$23,370.04	\$30,322.63	\$58,876.25	\$118,450.27	\$21,493.03	\$411,118.11

	January 04	February 04	March 04	April 04	May 04	June 04	July 04	August 04	September 04	October 04	November 04	December 04
<u>CUSTOMER No.</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>	<u>Therms</u>
<b><u>BROCKTON DIV.</u></b>												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	186	0	121,895	55,693	56,212	61,700	39,405	37,493	81,147	120,957	21,109
6	0	0	0	0	0	0	0	2,000	4,079	5,284	9,481	1,920
7	1,036	609	0	0	0	0	427	7,570	22,711	27,006	13,648	0
8	0	0	0	0	0	0	4,753	10,239	14,387	9,930	6,675	0
9	0	0	0	4,598	4,440	1,934	0	0	322	8,747	584	0
10	1,031	0	0	11,547	25,979	18,842	9,785	11,308	11,210	42,662	4,381	0
11	0	0	0	0	0	135	0	0	0	0	0	0
12	0	0	0	3,660	0	5,694	10,941	0	0	0	0	0
13	29,412	0	0	16,960	21,042	24,505	31,242	26,902	22,846	28,304	8,500	0
14	0	0	0	0	0	0	4,992	0	47,008	128,375	939	0
15	1,046	0	0	0	0	0	802	0	0	0	0	0
16	0	0	0	4,536	2,070	6,042	8,890	43,314	41,830	15,903	58,383	53
17	0	0	0	0	0	0	0	0	0	0	42	2,132
18	0	0	0	0	0	1,113	17,957	19,883	24,414	10,989	21,851	0
19	0	0	0	0	18,009	81,719	36,816	0	2,808	2,873	0	0
20	0	0	0	0	0	0	0	0	0	0	42	0
21	0	0	0	309	5,279	104	12,272	3,036	936	1,026	1,775	0
22	0	0	0	103	0	0	0	0	0	0	73	0
23	0	0	0	21,187	1,014	5,715	1,666	0	426	956	5,215	0
<b><u>SPRINGFIELD DIV.</u></b>												
1	0	0	0	0	0	0	0	0	0	0	43	0
2	0	0	0	0	5,024	16,095	16,924	13,136	14,382	0	0	0
3	0	0	0	94	89	86	0	21	43	54	26,030	0
4	0	0	0	214	9,579	25,740	27,449	23,903	29,765	23,786	13,117	1,460
5	0	0	0	4,636	1,478	0	0	0	0	2,538	10,404	2,726
6	0	0	0	11	0	0	0	0	0	0	0	0
7	0	0	0	448	3,556	3,357	1,810	1,882	3,192	5,606	4,450	0
8	0	0	0	438	1,121	3,326	2,507	2,226	2,464	4,676	966	0
9	0	0	0	1,926	622	121	0	0	111	1,374	8,636	1,144
10	438	0	0	0	0	0	0	0	0	291	7	383
11	0	0	0	0	0	0	0	0	0	0	2,885	0
12	0	0	0	69	0	0	0	0	0	0	41	0
13	0	0	0	7,459	7,632	5,924	6,106	5,667	5,808	10,504	782	0
14	0	0	0	0	0	0	0	0	0	0	18,593	0
15	0	0	0	0	2,089	354	0	0	788	526	42,692	0
16	0	0	0	1,498	1,223	0	0	0	0	4,444	7,275	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	18,734	12,354	11,598	14,999	36,582	467	0
19	0	0	0	0	21,562	23,647	24,143	18,489	19,958	28,028	61,834	0
20	1,179	665	735	438	1,610	4,054	0	0	0	253	0	0
21	0	0	0	5,686	25,750	14,680	14,043	13,581	18,523	31,876	22,322	15,540
22	0	0	0	0	0	0	0	0	0	0	457	0
23	0	0	0	0	60,569	0	0	0	7,969	107,070	17,143	0
24	1,873	522	224	204	0	0	0	0	0	0	0	0
25	2,976	451	1,387	0	0	0	5,313	0	333	101	0	0
26	8,335	582	0	2,333	2,756	13,714	26,055	18,443	15,551	8,580	0	40,469
<b><u>LAWRENCE DIV.</u></b>												
1	0	0	0	125	0	0	0	0	0	0	0	10
2	0	0	0	0	0	0	0	0	0	0	0	31
3	0	0	0	281	272	73	0	0	4,384	0	0	0
4	417	0	0	134,289	26,829	14,000	10,460	5,185	23,679	261,648	331,310	21,341

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-41 Refer to Schedule JAF-1-1. Please explain what lines 15 and 16 are and why the corresponding data in Column 7 appears not to be derived from the data in the previous columns. Explain how the data appearing on lines 15 and 16 in each of the columns were calculated and what each represents.

Response: Line 15, Account 495.26 (Carrying Costs - pre-tax of return) is revenue received (passed back) for the following Regulatory Assets:

- 1) Acct 182-11 Working Capital Deferred Peak Commodity.
- 2) Acct 182-13 Working Capital Deferred Peak Demand.
- 3) Acct 182-16 Deferred Gas cost bad debt.
- 4) Acct 182-20 Working Capital Deferred Off-Peak Demand.
- 5) Acct 182-21 Working Capital Deferred Off-Peak Commodity.
- 6) Acct 182-38 DSM Lost Net Revenue (May filing).
- 7) Acct 182-39 DSM Lost Net Revenue (November filing).
- 8) Acct 182-40 DSM Lost Net Revenue Inactive.
- 9) Acct 182-87 DSM Lost Base Revenue.
- 10) Acct 480-484 Interest Normalization for gas cost and associated bad debt.

**Column 1** shows Account 495.26 per the Company's Financial Statements.

**Column 2** shows the revenue in Account 495.26 based on gas costs. Specifically it includes Acct 182-11 Working Capital Deferred Peak Commodity, Acct 182-13 Working Capital Deferred Peak Demand, Acct 182-16 Deferred Gas cost bad debt, Acct 182-20 Working Capital Deferred Off-Peak Demand, Acct 182-21 Working Capital Deferred Off-Peak Commodity and Acct 480-484 Interest Normalization for gas cost and associated bad debt.

**Column 3** shows the revenue in Account 495.26 not based on gas costs. Specifically it includes Acct 182-38 DSM Lost Net Revenue (May filing), Acct 182-39 DSM Lost Net Revenue (November filing), Acct 182-40 DSM Lost Net Revenue Inactive, and Acct 182-87 DSM Lost Base Revenue. These revenues are shown in column 3 since they are considered non-recurring.

**Column 7** is the result of starting with per books revenue in column 1, subtracting gas cost in column 2 and non-recurring revenue in column 3. Since all revenue on line 15 is either gas cost or non-recurring, column 7 is essentially equal to zero (\$1 rounding).

Line 16, Account 495.27 (Production and Storage revenue) is revenue received (passed back) for the following Regulatory Assets:

- 1) Acct 182-18 Off-Peak production and storage demand.
- 2) Acct 182-48 Peak production and storage demand.

These revenues represent the portion of the revenue requirement of the Company's LNG and LP plants associated with the gas supply function, as well as dispatching and gas acquisition costs.

**Column 1** shows Account 495.27 per the Company's Financial Statements.

**Column 2** shows the actual revenue recoveries in Account 495.27.

**Column 3** shows the non-recurring revenue difference between column 1 – column 2 and the agreed upon annual amount of recovery set in the Company's last rate proceeding, a revenue neutral rate design case, D.P.U. 95-52 and 95-104 of \$9,129,632.

**Column 7** is the result of starting with per books revenue in column 1, subtracting gas costs in column 2 and non-recurring revenue in column 3, resulting in the agreed upon annual amount of \$9,129,632.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
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D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-44 Refer to Schedule JAF-1-1. Does the Company Plan to increase any of the fees for the services listed on lines 8-11 during the rate year? If yes, provide the new fees for each service element. Calculate the annualized effect of these changes based on the test year bill determinants. Provide all supporting workpapers, calculations and assumptions.

Response: See responses to AG-9-42 and AG-9-43 for Lines 8 and 9.

There are planned increases in the rate year for Guardian Care Service Contracts, Fee for Service Repairs and Central AC Inspections. The rate schedules for Guardian Care, Fee for Service and Annual Inspections are presented on Attachment AG-9-44(a). The impact of the rate increases is presented on Attachment AG-9-44(b).



**BAY STATE GAS COMPANY**  
**Planned Guardian Care Rates Effective 1-15-06**

Heating & WH Plans		Payment Option	2006 Rates	
Basic	Annual		125.95	
Plus	Annual		137.95	
Plus	Special Plus Plan Annual		124.95	
Basic/WH	Annual		140.95	
Plus/WH	Annual		152.95	
Plus/WH	Spcl Plus W/W Hter Annl		136.95	
Open - Residential	Annual		Varies	
GC for Business- 1	Annual		195.00	
GC for Business- 2	Annual		285.00	
GC for Business - Open	Annual		Varies	
Basic	Monthly		11.49	
Plus	Monthly		12.49	
Basic/WH	Monthly		12.74	
Plus/WH	Monthly		13.74	
Open - Residential	Monthly		Varies	
GC for Business- 1	Monthly		16.25	
GC for Business- 2	Monthly		23.75	
GC for Business - Open	Monthly		Varies	
Basic	3 Installments		42.98	
Plus	3 Installments		46.98	
Basic/WH	3 Installments		47.98	
Plus/WH	3 Installments		51.98	
Open - Residential	3 Installments		Varies	
Total Heating and WH Plans				
Gas Line Protection	Annual		18.00	
Gas Line Protection	Monthly		1.50	
Gas Line Protection	3 Installments		6.00	
Total Gas Line Protection				

**Fee for Service**

Planned Rates effective July 1, 2006		
	First 30 minutes	Add 15 minutes
Regular Business Hours	105.00	30.00
Saturday and After Hours	125.00	30.00
Sunday and Holiday	135.00	35.00

**Annual Inspections**

Planned Rates effective March 1, 2006		
Heating Peak Period	September 1 - March 31	\$99.95
Heating Off Peak Period	April 1 - August 31	\$74.95
Heating Off Peak Period	April 1 - August 31 Guardian Care	\$64.95
Central AC Inspection		\$134.00
Central AC Inspection with Heating Inspection		\$114.00

**Fee for Service Repairs**

Impact of Rate Increase on Test Year Revenues

	Rate Increases planned during the rate year	Test Year Annual Volumes	2005 Annual Volumes	2006 Annual Volumes	Rate Year Volumes	Revenue Change from Rate Increase
Nov - Dec	\$0	1,494	1,335	1,237	1,335	\$0.00
Jan - Jun	\$0	3,805	3,398	3,149	3,149	\$0.00
July - Oct	\$5	1,389	1,241	1,150	1,150	\$5,750.00
Total		6,688	5,974	5,536	5,634	\$5,750.00

July/Oct % of Total                      21%              21%              21%  
Nov/Dec % of Total                      22%              22%              22%

**Central AC Inspections**

Central AC Inspections 2006 Rate Increase	\$5
Rate Year Volumes	1,486
Annualized Effect of Rate Change	\$7,430

**Guardian Care**

Guardian Care 2006 Rate Increase	\$5
Projected Rate Year Customer Count	43,774
Annualized Effect of Rate Change	\$218,870

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-45 Refer to Schedule JAF-1-1. Have any of the fees for the services listed on lines 8-11 changed since the beginning of the test year? If yes, provide the new fees for each service element and the date the change became effective. Calculate the annualized effect of these changes based on the test year bill determinants. Provide all supporting workpapers, calculations and assumptions.

Response: See responses to AG-9-42 and AG-9-43 for Lines 8 and 9.

The Company increased its rates for Conversion Burner Rentals on June 1, 2005, for Guardian Care Service Contracts beginning on January 15, 2005, on Fee for Service Repairs on March 8, 2005 and Heating Annual Inspections on March 8, 2005. The Conversion Burner Rental rate increases are presented on Attachment AG-9-45(a). The annual revenue impact of the Conversion Burner Rental rate increases is presented on Attachment AG-9-45(b). The analysis of the annual revenue impact, which shows a decrease of \$220,305, reflects that the Company has experienced a reduction in Conversion Burner rentals since the 2004 test year. The reduction of rentals can be attributable to two primary factors. First, the Company is no longer installing new residential rental conversion burners. Conversion burners are no longer an attractive option for either the Company or for homeowners for several reasons:

- The cost and complexity of the installation has risen dramatically due to several issues, most prominently the need for chimney liners and issues regarding make up air.
- The increased complexity and cost results in a higher rental rate than is deemed marketable.
- An increasing number of newer heating systems are not suitable for conversion, leaving only older systems as candidates. These systems tend to be less efficient. Installing a conversion burner in these systems is more likely to increase the number of high bill complaints.

Second, with no new rentals going in, and with the majority of the installations happening more than 15 years ago, conversion burners tend to be in very old systems that are now failing and being replaced with new gas design equipment.

The 2005 rate schedules for Guardian Care, Fee for Service and Annual Inspections are presented on Attachment AG-9-45(c). The annual revenue impact associated with the resulting rate increases for Fee for Service, Annual Inspection and Guardian Care are presented on Attachment AG-9-45(d). The annual revenue impact of Fee for Service, which is a decrease of \$71,960, also reflects the on-going reduction in the volume of service calls ("Annual Volumes").

**Bay State Gas Company**

**Conversion Burner Rate Increases**

Model	Description	<u>Monthly</u>	
		2004 Rate	2005 Rate
1 - E20A		12.95	14.95
2 - DS24		13.95	15.95
3 - 400-02		13.95	15.95
4 - DS45		15.95	17.95
5 - 400-33		20.95	22.95
6 - F400-33		22.95	24.95
7 - G56		34.95	36.95
8 - RE32		13.95	15.95
9 - J-30		32.95	34.95
10 - Standard Svc	Small Burner - Gas Service Required	24.95	24.95
11 - Standard LU	Small Burner - Low Use Upgrade	19.95	19.95
12 - Lg Res LU	Large Burner - Low Use Upgrade	25.95	25.95
13 - Med Comm LU	Medium Burner - Low Use Upgrade	47.95	47.95
15- Lg Res Svc	Large Burner - Gas Service Required	33.95	33.95
16 - Med Comm Svc	Medium Burner - Gas Service Required	59.95	59.95
20 - Open Price	Installed prior to CIS conversion	Varies	Varies

Total

**Bay State Gas Company**  
**Rental Conversion Burners**  
**Impact of Rate Increase and Count Change in the Rate Year**

		<u>Count</u>	<u>Mo. Revenue</u>	<u>Mo. Rate</u>
2004	Brockton	5229	<b>\$75,767</b>	14.49
Fourth	Springfield	4045	<b>\$59,600</b>	14.73
Quarter	Lawrence	1167	<b>\$17,333</b>	14.85
	Total	10,441	<b>\$152,700</b>	14.63

		* Forecast Count	Forecast Revenue	Rev/Cust	Revenue Change from Rate Increase	Revenue Change from Count Decrease	Net Revenue Change
2005							
Nov-05	Brockton	4403	\$72,604	\$ 16.49	\$ 10,458	\$ (13,620)	\$ (3,162)
	Springfield	3406	\$56,997	\$ 16.73	\$ 8,090	\$ (10,693)	\$ (2,603)
	Lawrence	983	<u>\$16,566</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (3,101)</u>	<u>\$ (767)</u>
	Total	8,792	\$146,167	\$ 16.63	\$ 20,882	\$ (27,415)	\$ (6,533)
Dec-05	Brockton	4335	\$71,483	\$ 16.49	\$ 10,458	\$ (14,742)	\$ (4,284)
	Springfield	3353	\$56,110	\$ 16.73	\$ 8,090	\$ (11,580)	\$ (3,490)
	Lawrence	968	<u>\$16,314</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (3,354)</u>	<u>\$ (1,020)</u>
	Total	8,656	\$143,906	\$ 16.63	\$ 20,882	\$ (29,676)	\$ (8,794)
Jan-06	Brockton	4268	\$70,378	\$ 16.49	\$ 10,458	\$ (15,847)	\$ (5,389)
	Springfield	3301	\$55,240	\$ 16.73	\$ 8,090	\$ (12,450)	\$ (4,360)
	Lawrence	953	<u>\$16,061</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (3,607)</u>	<u>\$ (1,273)</u>
	Total	8,522	\$141,679	\$ 16.63	\$ 20,882	\$ (31,903)	\$ (11,021)
Feb-06	Brockton	4202	\$69,290	\$ 16.49	\$ 10,458	\$ (16,935)	\$ (6,477)
	Springfield	3250	\$54,386	\$ 16.73	\$ 8,090	\$ (13,304)	\$ (5,214)
	Lawrence	938	<u>\$15,808</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (3,859)</u>	<u>\$ (1,525)</u>
	Total	8,390	\$139,484	\$ 16.63	\$ 20,882	\$ (34,098)	\$ (13,216)
Mar-06	Brockton	4137	\$68,218	\$ 16.49	\$ 10,458	\$ (18,007)	\$ (7,549)
	Springfield	3200	\$53,550	\$ 16.73	\$ 8,090	\$ (14,140)	\$ (6,050)
	Lawrence	923	<u>\$15,555</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (4,112)</u>	<u>\$ (1,778)</u>
	Total	8,260	\$137,323	\$ 16.63	\$ 20,882	\$ (36,259)	\$ (15,377)
Apr-06	Brockton	4073	\$67,163	\$ 16.49	\$ 10,458	\$ (19,062)	\$ (8,604)
	Springfield	3150	\$52,713	\$ 16.73	\$ 8,090	\$ (14,977)	\$ (6,887)
	Lawrence	909	<u>\$15,319</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (4,348)</u>	<u>\$ (2,014)</u>
	Total	8,132	\$135,195	\$ 16.63	\$ 20,882	\$ (38,387)	\$ (17,505)
May-06	Brockton	4010	\$66,124	\$ 16.49	\$ 10,458	\$ (20,101)	\$ (9,643)
	Springfield	3101	\$51,893	\$ 16.73	\$ 8,090	\$ (15,797)	\$ (7,707)
	Lawrence	895	<u>\$15,083</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (4,584)</u>	<u>\$ (2,250)</u>
	Total	8,006	\$133,100	\$ 16.63	\$ 20,882	\$ (40,482)	\$ (19,600)
Jun-06	Brockton	3948	\$65,101	\$ 16.49	\$ 10,458	\$ (21,123)	\$ (10,665)
	Springfield	3053	\$51,090	\$ 16.73	\$ 8,090	\$ (16,600)	\$ (8,510)
	Lawrence	881	<u>\$14,847</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (4,820)</u>	<u>\$ (2,486)</u>
	Total	7,882	\$131,038	\$ 16.63	\$ 20,882	\$ (42,544)	\$ (21,662)
Jul-06	Brockton	3887	\$64,095	\$ 16.49	\$ 10,458	\$ (22,129)	\$ (11,671)
	Springfield	3006	\$50,303	\$ 16.73	\$ 8,090	\$ (17,387)	\$ (9,297)
	Lawrence	867	<u>\$14,611</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (5,056)</u>	<u>\$ (2,722)</u>
	Total	7,760	\$129,010	\$ 16.63	\$ 20,882	\$ (44,572)	\$ (23,690)
Aug-06	Brockton	3827	\$63,106	\$ 16.49	\$ 10,458	\$ (23,119)	\$ (12,661)
	Springfield	2959	\$49,517	\$ 16.73	\$ 8,090	\$ (18,173)	\$ (10,083)
	Lawrence	854	<u>\$14,392</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (5,275)</u>	<u>\$ (2,941)</u>
	Total	7,640	\$127,015	\$ 16.63	\$ 20,882	\$ (46,567)	\$ (25,685)
Sep-06	Brockton	3768	\$62,133	\$ 16.49	\$ 10,458	\$ (24,091)	\$ (13,633)
	Springfield	2913	\$48,747	\$ 16.73	\$ 8,090	\$ (18,943)	\$ (10,853)
	Lawrence	841	<u>\$14,173</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (5,494)</u>	<u>\$ (3,160)</u>
	Total	7,522	\$125,053	\$ 16.63	\$ 20,882	\$ (48,529)	\$ (27,647)
Oct-06	Brockton	3710	\$61,177	\$ 16.49	\$ 10,458	\$ (25,048)	\$ (14,590)
	Springfield	2868	\$47,994	\$ 16.73	\$ 8,090	\$ (19,696)	\$ (11,606)
	Lawrence	828	<u>\$13,954</u>	<u>\$ 16.85</u>	<u>2,334</u>	<u>\$ (5,713)</u>	<u>\$ (3,379)</u>
	Total	7,406	\$123,125	\$ 16.63	\$ 20,882	\$ (50,457)	\$ (29,575)
	<u>Rate Year Total</u>						
	Brockton		\$ 800,872		\$ 125,496	\$ (233,824)	\$ (108,328)
	Springfield		\$ 628,538		\$ 97,080	\$ (183,742)	\$ (86,662)
	Lawrence		<u>\$ 182,685</u>		<u>\$ 28,008</u>	<u>\$ (53,323)</u>	<u>\$ (25,315)</u>
	Total		\$ 1,612,095		\$ 250,584	\$ (470,889)	\$ (220,305)

\* Forecast Count based on on-going 1.55% reduction over the years of CB Rentals.

**BAY STATE GAS COMPANY**  
**Guardian Care Rates Effective 1-15-05**

Heating & WH Plans		Payment Option	2005 Rates	
Basic	Annual		120.95	
Plus	Annual		132.95	
Plus	Special Plus Plan Annual		119.95	
Basic/WH	Annual		135.95	
Plus/WH	Annual		147.95	
Plus/WH	Spcl Plus W/W Hter Annl		131.95	
Open - Residential	Annual		Varies	
GC for Business- 1	Annual		190.00	
GC for Business- 2	Annual		280.00	
GC for Business - Open	Annual		Varies	
Basic	Monthly		11.07	
Plus	Monthly		12.07	
Basic/WH	Monthly		12.32	
Plus/WH	Monthly		13.32	
Open - Residential	Monthly		Varies	
GC for Business- 1	Monthly		15.83	
GC for Business- 2	Monthly		23.33	
GC for Business - Open	Monthly		Varies	
Basic	3 Installments		41.31	
Plus	3 Installments		45.31	
Basic/WH	3 Installments		46.31	
Plus/WH	3 Installments		50.31	
Open - Residential	3 Installments		Varies	
Total Heating and WH Plans				
Gas Line Protection	Annual		18.00	
Gas Line Protection	Monthly		1.50	
Gas Line Protection	3 Installments		6.00	
Total Gas Line Protection				

**Fee for Service**

<b>Rates effective March 8, 2005</b>	First 30 minutes	Add 15 minutes
Regular Business Hours	100.00	30.00
Saturday and After Hours	120.00	30.00
Sunday and Holiday	130.00	35.00

**Annual Inspections**

<b>Rates effective March 8, 2005</b>		
Heating Peak Period	September 1 - March 31	\$99.95
Heating Off Peak Period	April 1 - August 31	\$74.95
Heating Off Peak Period	April 1 - August 31 Guardian Care	\$64.95
Central AC Inspection		\$129.00
Central AC Inspection with Heating Inspection		\$109.00

**Fee for Service Repairs**

Impact of Rate Increase on Test Year Revenues

	Rate Increase since the Test Year	Test Year Annual Volumes	2005 Annual Volumes	2006 Annual Volumes	Rate Year Volumes	Revenue Change from Rate Increase	Revenue Change from Volume Decrease	Total Revenue Change
Nov - Dec	\$5	1,494	1,335	1,237	1,335	\$6,675.00	(\$15,105.00)	(\$8,430.00)
Jan - Jun	\$5	3,805	3,398	3,149	3,149	\$15,745.00	(\$62,320.00)	(\$46,575.00)
July - Oct	\$5	1,389	1,241	1,150	1,150	\$5,750.00	(\$22,705.00)	(\$16,955.00)
Total		6,688	5,974	5,536	5,634	\$28,170.00	(\$100,130.00)	(\$71,960.00)

July/Oct % of Total                      21%              21%              21%  
Nov/Dec % of Total                      22%              22%              22%

**Annual Inspections**

Heating Inspection 2005 Rate Increase	\$5
Rate Year Volumes	10,687
Annualized Effect of Rate Change	\$53,435

**Guardian Care**

Guardian Care 2005 Rate Increase	\$5
Projected Rate Year Customer Count	43,774
Annualized Effect of Rate Change	\$218,870



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D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-46 Refer to Schedule JAF-1-1, lines 8-11. Since the beginning of the test year has the Company introduced any new services? If yes, please describe these services, provide the fees for each of the new services and provide the number of customers receiving the services currently. Include a calculation of the annual revenue increase due to these new services. Provide all supporting workpapers, calculations and assumptions.

Response: See responses to AG-9-42 and AG-9-43 for Lines 8 and 9.

The Company has not introduced any new services since the beginning of the test year, January 1, 2004. Also see response to AG-1-32.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-47 Refer to Schedule JAF-1-1, lines 8-11. Is the Company planning to offer new services in any of these categories? If yes, please describe these services, provide the fees for each of the new services and provide the number of customers receiving the services currently. Include a calculation of the annual revenue increase due to these new services. Provide all supporting workpapers, calculations and assumptions.

Response: See responses to AG-9-42 and AG-9-43 for Lines 8 and 9.

The Company is not planning to offer any new services, with the exception of expanding its Guardian Care product to include Central Air Conditioning, which shares components with the customer's heating system. (See also response to AG-1-32.) The anticipated rate for the service plan is \$119.95 per year. The projected number of customers is 855 in 2006, which is the initial roll out year, and 1,850 in 2007. The projected revenue for 2006 is \$43,134, reflecting just a partial year of revenue from the 855 customers. The projected revenue for a full year in 2007 serving the increased number of customers of 1,850 is \$221,908.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
NINTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager Regulatory Policy

AG-9-53      For each of the Company's current Special Contracts provide for the test year the monthly billings, the corresponding bill determinants. Include the calculations of the test year revenue that would have been generated by each of these customers had they been on the tariffed rate they qualified for. Identify each customer by the code assigned in the response to the previous request. Provide all supporting workpapers, calculations and assumptions.

Response:      Please see Bay State's response to AG-9-19 for this information.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
FOURTEENTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-14-3 Refer to Exh. BSG/DGC-1, p. 17 of 63, lines 3-5. For each of the years 1995 to 2005, provide the average number of leaks per mile for unprotected steel in Brockton for the Company and the average number of leaks per mile for unprotected steel for the other regional LDCs. List the other regional LDCs by name. Define which communities are included in "Brockton" as that term is used in the cited section of the prefiled testimony.

Response: A) The corrosion leakage on unprotected steel (this assumes that all corrosion leakage in the system is on the unprotected portion of the system) in the Brockton system is as follows:  
1995 - .95 leaks per mile, 1996 - .97 leaks per mile, 1998 - .88 leaks per mile, 1999 – 1.12 leaks per mile, 2000 – 1.53 leaks per mile, 2001 – 1.40 leaks per mile, 2002 – 1.15 leaks per mile, 2003 – 1.54 leaks per mile, 2004 – 1.38 leaks per mile.

B) Bay State does not keep statistical data on other LDCs but to the extent that it has such information it is contained in the Rudden report submitted in the response to AG-2-16 (a).

C) All of the 42 cities and towns in the Brockton service territory (see Attachment AG-14-3) are inclusive in the testimony reference "Brockton".

**Municipalities Served by Bay State Gas: Brockton Division**

Attleboro	AT
Avon	AO
Bellingham	BM
Berkley	BE
Bridgewater	BO
Brockton	OO
Canton	CO
Dighton	DI
Dover	DV
Duxbury	DX
East Bridgewater	EB
Easton	EA
Foxboro	FX
Franklin	FR
Halifax	HF
Hanover	HV
Hanson	HS
Holbrook	HL
Lakeville	LK
Mansfield	MN
Marshfield	MO
Medfield	MD
Medway	MW
Mendon	XM
Middleborough	MB
Millis	ML
Norfolk	NF
Norton	NT
Norwell	NO
Pembroke	PO
Plympton	PL
Randolph	RO
Raynham	RA
Rehoboth	XR
Scituate	SI
Seekonk	SK
Sharon	SH
Stoughton	ST
Taunton	TA
Walpole	WA
West Bridgewater	WB
Wrentham	WT

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
FOURTEENTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-14-4 Refer to Exh. BSG/DGC-1, p. 17 of 63, lines 7-8. Explain in detail how the Company determines which steel segments are most at risk and in need of replacement, including in this response any written Company documents that include this standard.

Response: Bay State determines which steel segments are most at risk using several different methodologies:

- 1) When field crews are doing work on the various segments of the system they perform a visual inspection of the facilities they are working on and capture that data on the work order. In addition, if in their judgment the condition of the facility requires immediate action, they notify a supervisor who does a further inspection and then makes a determination on the necessary follow up action.
- 2) Bay State does an annual review of its corrosion leak maps, a review of the Work Order system, and interviews with field supervisors and engineers to determine the facilities that it plans to replace. This constitutes Bay State's method for compliance with 192.457 and 192.465.
- 3) Bay State has an ongoing program of reviewing state and municipal construction plans for conflicts that could put its facilities at risk to damage from construction or unusual ground movement. When locations are identified where these conflicts exist the facilities are replaced. (This assessment is not exclusive to steel but takes place with all pipe types).
- 4) Bay State has an ongoing program of reviewing state and municipal construction plans for full depth construction in the are of its older facilities and replaces those facilities in conjunction with the construction. (This practice would include Bare Steel, Coated Unprotected Steel, and Cast Iron facilities.)

COMMONWEALTH OF MASSACHUSETTS  
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RESPONSE OF BAY STATE GAS COMPANY TO THE  
FOURTEENTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-14-5 Refer to Exh. BSG/DGC-1, p. 17 of 63, lines 16-17. What is the Company's five year historic replacement rate? Did the Company set that rate pursuant to a preexisting replacement schedule or plan? If "yes", please provide a copy of the replacement schedule or plan and provide the date(s) when it was adopted and amended. When installed, what was the expected useful life of the unprotected steel that remains to be replaced? Include in your response the dates that this bare steel and the coated steel without cathodic protection was installed.

Response: A) For Bay State's 5-year historic replacement rate please see Attachment AG-14-5.

B) This replacement rate was not mandated by a pre-existing schedule but was based on year-to-year capital planning, prioritizing, and system needs.

C) The depreciation rate of these facilities is 40 years. If at the time of installation the depreciation rate or "expected life" of the facility was different from that of the current depreciate rate, the Company no longer has any record of what that may have been.

D) Although Bay State does not have precise records that show by year when each facility type were installed, the Company is confident that generally bare steel was installed from the 1920's to the 1960's, and coated unprotected steel was installed during the 1950's and 1960's.

Main Replacements  
kms

**Combined BS and UPCS Main Abandonments due to Replacement Only**

Footage	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Brockton	48789	50390	92460	52929	48321	77062	55292	45625	38028	26974	43455	75342
Springfield	7902	23443	12016	3453	23937	13878	24938	17832	15511	4577	19254	3252
Lawrence	1335	2786	2799	4283	18467	7413	4304	1175	4230	6988	4740	3217
Total	58026	76619	107275	60665	90725	98353	84534	64632	57769	38539	67449	81811

**Bare Steel Main Abandonments due to Replacements only**

Footage	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Brockton	43181	44797	74181	40255	44466	62666	51535	40021	33074	18543	36867	69817
Springfield	7553	21773	11290	2995	21953	13056	23703	16740	10849	3927	19046	1992
Lawrence	1310	2057	2153	4108	18387	7009	3195	1168	3722	6136	4540	2625
Total	52044	68627	87624	47358	84806	82731	78433	57929	47645	28606	60453	74434

**Unprotected Coated Steel Main Abandonments due to Replacements only**

Footage	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Brockton	5608	5593	18279	12674	3855	14396	3757	5604	4954	8431	6588	5525
Springfield	349	1670	726	458	1984	822	1235	1092	4662	650	208	1260
Lawrence	25	729	646	175	80	404	1109	7	508	852	200	592
Total	5982	7992	19651	13307	5919	15622	6101	6703	10124	9933	6996	7377

Data From Work Order Management System query 5/13/05  
Data reflects Footage retired  
Work codes used MR---  
UPCS assumption pipe installed prior to 1971



COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
EIGHTEENTH SET OF INFORMATION REQUESTS FROM THE ATTORNEY GENERAL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

AG-18-7      Please provide the workpapers, calculations, formulas, assumptions and other supporting documentation used to determine the fees to be paid by NiSource and that proportion to be paid by Bay State Gas Company for each of the four OTD projects and any EIC projects.

Response:    Bay State does not pay any proportion of the NiSource funds contributed to GTI. The only funds that have to date been contributed by Bay State, either directly or indirectly, are the East Coast Distributor Funds.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
THIRD SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

DTE-3-1 Refer to Exh. BSG/DGC-1, at 8. Please provide copies of:

- 1) the referenced U.S. Department of Transportation and Department regulations concerning leakage surveys;
- 2) any other policy manuals or publications used by the Company in performing its annual leak detection surveys on mains; and
- 3) any reports prepared based on the annual leak detection surveys for years 2000 through 2004.

Response:

- 1) Attached as Attachment DTE-3-1(a), please find a copy of 49 CFR Part192.723.
- 2) Attached as Attachment DTE-3-1(b), please find a copy of Bay State Gas' Operating & Maintenance (O&M) Procedure 14.06, Distribution System Surveys
- 3) The Company utilizes leak survey consultants to conduct leak surveys in each of its three service territories. At the beginning of each year, the Company provides the leak survey consultants territory maps of its entire system. The maps show the location of all gas mains in both business districts and non-business districts. As each gas main is surveyed for leaks, the consultant highlights on the map, the segment of mains surveyed. The consultant also writes the date on which the survey was performed on the map. The process and documentation is consistent in each service territory. Throughout our Massachusetts territories, we have approximately 420 territory maps for each of the 5 years in question. As described elsewhere in this proceeding, the quantity of maps, combined with the colored highlights, would make it very difficult and expensive to reproduce all the maps associated with each service territory.

[Code of Federal Regulations]

[Title 49, Volume 3]

[Revised as of October 1, 2004]

From the U.S. Government Printing Office via GPO Access

[CITE: 49CFR192.723]

[Page 88]

## TITLE 49--TRANSPORTATION

### CHAPTER I--RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION, DEPARTMENT OF TRANSPORTATION (CONTINUED)

#### PART 192\_TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS--Table of Contents

##### Subpart M\_Maintenance

#### Sec. 192.723 Distribution systems: Leakage surveys.

(a) Each operator of a distribution system shall conduct periodic leakage surveys in accordance with this section.

(b) The type and scope of the leakage control program must be determined by the nature of the operations and the local conditions, but it must meet the following minimum requirements:

(1) A leakage survey with leak detector equipment must be conducted in business districts, including tests of the atmosphere in gas, electric, telephone, sewer, and water system manholes, at cracks in pavement and sidewalks, and at other locations providing an opportunity for finding gas leaks, at intervals not exceeding 15 months, but at least once each calendar year.

(2) A leakage survey with leak detector equipment must be conducted outside business districts as frequently as necessary, but at least once every 5 calendar years at intervals not exceeding 63 months. However, for cathodically unprotected distribution lines subject to Sec. 192.465(e) on which electrical surveys for corrosion are impractical, a leakage survey must be conducted at least once every 3 calendar years at intervals not exceeding 39 months.

[35 FR 13257, Aug. 19, 1970, as amended by Amdt. 192-43, 47 FR 46851, Oct. 21, 1982; Amdt. 192-70, 58 FR 54528, 54529, Oct. 22, 1993; Amdt. 192-71, 59 FR 6585, Feb. 11, 1994; Amdt. 192-94, 69 FR 32895, June 14, 2004; Amdt. 192-94, 69 FR 54592, Sept. 9, 2004]

**DISTRIBUTION SYSTEM SURVEYS**

1. A gas detector survey (using combustible gas indicators, flame ionization equipment, infrared equipment and/or other industry accepted testing equipment) shall be conducted on distribution systems in business districts. The survey conducted should include tests of the atmosphere in gas, electric, telephone, sewer and water system manholes, catch basins, at cracks in pavement and sidewalks, and at other locations providing an opportunity for finding gas leaks. Business districts are defined as areas within pavement from building wall to building wall and/or where the principal commercial activity of the city or town takes place.
2. A leak survey shall be conducted on distribution systems outside of business districts.
3. Distribution system surveys of areas within business districts must be done at least once annually and at intervals not exceeding 15 months. Furthermore, in New Hampshire, this survey must be done between March 1 and December 1.
4. Distribution system surveys outside business districts must be done at least once annually. In New Hampshire, this survey must be done between March 1 and December.
5. Records of leak detection surveys must be made and retained for the period of time prescribed by regulations.

References:

49 CFR 192.723  
220 CMR 101.06(21)  
NH PUC 508.04  
ME PUC 420(3)

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
THIRD SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

DTE-3-5      Refer to Exh. BSG/DGC-1, at 15. Please provide any studies, reports and memoranda relied upon by the Company to support its conclusion that in recent years there have been an increasing number of leaks in areas where unprotected steel mains are concentrated.

Response:    Please see the response to DTE-3-6 and the attached graphs that plot corrosion leakage on unprotected steel piping in the BSG system. Please also see Bay State's response to AG-2-16.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
THIRD SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

DTE-3-32 Refer to Exh. BSG/DGC-1, at 22. Please provide capital authorization and closing reports for Bay State's steel infrastructure replacement projects costing over \$50,000 that were associated with the Company's 2004 commitment of \$8 million.

Response: Please see Attachment DTE-3-32 for the capital authorization and closing reports associated with the steel infrastructure replacement projects costing over \$50,000.

The attachment consists of a summary schedule (first 3 pages), followed by a cover sheet / identifier page, capital authorization, closing report (including when necessary a project cost variance summary) for each project listed in the exhibit. The capital authorization and closing reports for each individual project are preceded by the cover sheet / identifier page.

For easy identification, each cover sheet is marked with the exhibit title and the list number / reference number assigned to each project in Column 1 (List No.) of the response.

For example, the first page in the attachment is the cover sheet for project with the assigned list number 1 – Hanover / Webster Street. As such, the cover sheet has been labeled:

**Third Set of Information Requests From D.T.E.  
D.T.E – 3 -32**

Non-Discretionary Plant Additions  
Account 367 (Mains) > \$50K  
2004 Steel Infrastructure Replacement Projects > \$50K  
List No. 1

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
THIRD SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Joseph A. Ferro, Manager, Regulatory Policy  
John E. Skirtich, Consultant (Revenue Requirements)

DTE-3-34 Please provide a complete filing of the Company's steel infrastructure replacement ("SIR") Base Rate Adjustment. For purposes of this response, assume that the Company's SIR Base Rate Adjustment had been approved in 2003 and that the Company has spent approximately \$8 million during the first year's (2004) operation of the SIR program. Provide all supporting schedules as listed in Exh. BSG/JES-1, Sch. JES-17 and in Exh. BSG/SHB-1, at 42-43. If the \$8 million represents the total capital expenditures for bare steel main replacement in 2004, calculate the eligible additions for SIR as the difference between \$8 million (or the actual 2004 amount) and the four-year average historical bare steel replacement capital expenditure shown in Schedule JES-17, at 3. Provide copies of all invoices over \$1,000 as indicated in Exhibit BSG/SHB-1, at 43. Provide a complete description of the filing and explain all assumptions used.

Response: The SIR Base Rate Adjustment is part of the Company's proposed Annual Base Rate Adjustment Mechanism ("ABRAM"). As described in Exhibit JAF-2, pages 23-33, the Company proposes to add the SIR Base Rate Adjustment to the base rate changes resulting from the Company's Performance Base Rate ("PBR") plan annual rate adjustment. The hypothetical SIR Base Rate Adjustment associated with calendar year 2004 that would be part of the annual base rate adjustment reflects the following:

- Actual 2004 "Total Direct Additions" of bare steel main replacement of \$7,384,117;
- The four-year average historical bare steel replacement capital expenditure, as presented in Exh. BSG/JES-1, Schedule JES-17, page 3, of \$3,232,995, resulting in "Eligible Additions For SIR" of \$3,342,873;
- The use of test year 2004 billing determinants as presented in Exh. BSG/JAF-1, Schedule JAF-1-4, pages 1-9, and in Exh. BSG/JAF-2, Schedule JAF-2-1, lines 17-57, totaling 609,712,995 therms.

In support of this SIR Base Rate Adjustment calculation and as an illustration of the schedules that would be provided in complete support of such a filing, the following schedules are attached:

- Attachment DTE-3-34 (a), Schedule JES-17-Revised, pages 1-12, which derives the SIR Base Rate Adjustment Revenue Requirement of \$1,307,731;
- Attachment DTE-3-34 (b), Schedule JAF-2-10-Revised, pages 1-6, which calculates the SIR Base Rate Adjustment, by allocating the \$1,307,731 of revenue requirement to each element of base rates of each rate class, and then dividing by the 2004 test year billing determinants;
- Attachment DTE-3-34 (c), pages 1-8, which presents the typical bill impacts for each rate class resulting from the SIR Base Rate Adjustment increase of \$1,307,731;
- The necessary materials for the Department to conduct a complete audit will be provided in a supplemental filing.



**Witness: Skirtich**  
**D.T.E. 05-27**  
**Exh.BSG/JES-1**  
**Schedule JES-17**  
**Page 1 of 12**

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Revenue Requirement**  
**SAMPLE**

<b><u>Ln.</u></b> <b><u>No.</u></b>	<b><u>Description</u></b> <b>(1)</b>	<b><u>Detail</u></b> <b>(2)</b> <b>(\$)</b>	<b><u>Total</u></b> <b>(3)</b> <b>(\$)</b>	<b><u>Reference</u></b> <b>(4)</b>
<b><u>Rate Base:</u></b>				
1	Property, Plant & Equipment (P,P &E)		4,379,163	Pg. 4 of 12, Col.6, Ln. 5.
2	Accumulated Reserve for Depreciation		(49,162)	Pg. 5 of 12, Col. 5, Ln. 5
3	Net P, P, & E (Ln. 1 + Ln. 2)		4,330,002	
4	Accumulated Deferred Income Tax		(45,131)	Pg. 7 of 12, Col. 18, Ln. 3.
5	Net Rate Base (Ln. 3 + Ln. 4)		4,284,871	
<b><u>Revenue Requirement:</u></b>				
6	Depreciation Expense		98,323	Pg. 6 of 12, Col. 7. Ln. 5
7	Property Tax		77,434	Pg. 8 of 12, Col. 4, Ln. 9
8	Carrying Costs - In Service to Rate Implementation		572,798	Pg. 9 of 12, Col. 5, Ln.23
9	Pre-tax return	13.05%	559,176	Pg. 10 of 12, Col. 5, Ln. 3
10	Revenue Requirement (Lns. 6 thru 10)		1,307,731	
<b><u>11 Previously Approved Increases:</u></b>				
12	Year 1	-		
13	Year 2	-		
14	Total (Ln. 12 plus Ln. 13)		-	
15	Additional Gross Revenue Request (Ln. 10 less Ln. 14)		1,307,731	
16	Total Program Year O&M Leak Repair Offset		-	Pg. 11 of 12, Col.3, Ln. 7
17	Net Additional Revenue Requirement (Ln. 15 less Ln. 16)		1,307,731	

Witness: Skirtich  
 D.T.E. 05-27  
 Exh.BSG/JES-1  
 Schedule JES-17  
 Page 2 of 12

Bay State Gas Company  
 SIR Base Rate Adjustment  
 Eligible Additions  
 SAMPLE

Ln. No.	Description	Current Year Total Direct Additions 1/ (1) (\$)	Four Year Avg. Pg. 3, Col. 6 (2) (\$)	Eligible Additions For SIR (3)=(1-2) (\$)
<u>Bare Steel Replacement Costs</u>				
1	Mains	5,872,209	2,733,699	3,138,510
2	Services	1,090,018	1,083,234	6,785
3	Meter Installations and Other Eligible Facilities	<u>421,890</u>	<u>224,311</u>	<u>197,579</u>
4	Total Cost	7,384,117	3,232,995	3,342,873

Witness: Skirtich  
 D.T.E. 05-27  
 Exh. BSG/JES -1  
 Schedule JES -17  
 Page 3 of 12

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Historical Bare Steel Replacement Capital Expenditures**  
**Direct Costs**  
**2000 through 2003**  
**ACTUAL**

<b><u>Ln.</u></b> <b><u>No.</u></b>	<b><u>Description</u></b> <b>(1)</b>	<b><u>2000</u></b> <b>(2)</b> <b>(\$)</b>	<b><u>2001</u></b> <b>(3)</b> <b>(\$)</b>	<b><u>2002</u></b> <b>(4)</b> <b>(\$)</b>	<b><u>2003</u></b> <b>(5)</b> <b>(\$)</b>	<b><u>Average</u></b> <b>(6)</b> <b>(\$)</b>
<b><u>Bare Steel Replacement Costs</u></b>						
1	Mains	1,683,647	3,555,845	2,533,660	3,161,644	2,733,699
2	Services	744,544	1,324,186	1,077,621	1,186,583	1,083,234
3	Other Additions	<u>130,265</u>	<u>292,982</u>	<u>224,915</u>	<u>249,083</u>	<u>224,311</u>
	Total Cost	2,558,456	5,173,013	3,836,196	4,597,310	3,232,995

**Witness: Skirtich**  
**D.T.E. 05-27**  
**Exh.BSG/JES-1**  
**Schedule JES-17**  
**Page 4 of 12**

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Property, Plant & Equipment**  
**SAMPLE**

<u>Ln.</u> <u>No.</u>	<u>Description</u>	<u>Beginning</u> <u>Balance</u>	<u>Eligible</u> <u>Additions</u> <u>Pg. 2, Col. 3.</u>	<u>Overheads @</u> <u>31%</u>	<u>Current</u> <u>Year</u> <u>Additions</u>	<u>Ending</u> <u>Balance</u>
	(1)	(2)	(3)	(4)=(3*31%)	(5)=(3+4)	(6)=(2+5)
		(\$)	(\$)	(\$)	(\$)	(\$)
1	Mains	-	3,138,510	972,938	4,111,448	4,111,448
2	Services	-	6,785	2,103	8,888	8,888
3	Meter Installations and Other Eligible Facilities	-	197,579	61,249	258,828	258,828
4	Regulators	-	-	-	-	-
5	Total P,P&E	-	3,342,873	1,036,290	4,379,163	4,379,163

**Witness: Skirtich**  
**D.T.E. 05-27**  
**Exh.BSG/JES-1**  
**Schedule JES-17**  
**Page 5 of 12**

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Reserve for Depreciation**  
**SAMPLE**

<b>Ln. No.</b>	<b>Description (1)</b>	<b>Beginning</b>	<b>Depreciation on Beginning Plant Balance Pg. 6 of 12 Col. 4</b>	<b>Depreciation on Current Additions Pg. 6 of 12 Col. 6</b>	<b>Ending Balance (5)=(2+3+4)</b>
		<b>Balance 1/ (2) (\$)</b>	<b>(3) (\$)</b>	<b>(4) (\$)</b>	<b>(5) (\$)</b>
1	Mains		-	44,609	44,609
2	Services		-	230	230
3	Meter Installations		-	4,323	4,323
4	Regulators	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
5	Total	<u><u>-</u></u>	<u><u>-</u></u>	<u><u>49,162</u></u>	<u><u>49,162</u></u>

**Witness: Skirtich**  
**D.T.E. 05-27**  
**Exh.BSG/JES-1**  
**Schedule JES-17**  
**Page 6 of 12**

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Depreciation**  
**SAMPLE**

<b>Ln. No.</b>	<b>Description (1)</b>	<b>Beginning Plant Balance (2) (\$)</b>	<b>Deprec. Rates (3) (\$)</b>	<b>Deprec. on Beginning Balance (4)=(2*3) (\$)</b>	<b>Current Year Additions Pg. 4 of 12 Col. 5 (5) (\$)</b>	<b>Half Year Depreciation on Additions (6)=(2+5)/2 (\$)</b>	<b>Annualized Depreciation (7)=(4+6*2)</b>
1	Mains	-	2.17%	-	4,111,448	44,609	89,218
2	Services	-	5.18%	-	8,888	230	460
3	Meters	-	3.34%	-	258,828	4,323	8,645
4	Regulators	-	4.06%	-	-	-	-
5	Total	-		-	4,379,163	49,162	98,323

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Tax Depreciation**  
**SAMPLE**

<b>Ln.</b>	<b>Tax Rate</b>	<b>Life</b>	<b>Year</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>	<b>Year 9</b>	<b>Year 10</b>	<b>Annual</b>	<b>Book</b>		<b>Differed</b>	<b>Accumulated</b>
<b>No.</b>	<b>Rates</b>			<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Additions</b>	<b>Tax</b>	<b>Deprec.</b>	<b>1/ 2/</b>	<b>Tax @</b>	<b>Deferred</b>
	<b>(1)</b>	<b>(2)</b>		<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>	<b>(9)</b>	<b>(10)</b>	<b>(11)</b>	<b>(12)</b>	<b>(13)</b>	<b>(14)</b>	<b>(15)</b>	<b>(16)</b>	<b>39.225%</b>	<b>Inc. Taxes</b>
				<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>	<b>(\$)</b>
1				4,379,163															
<b>Tax Depreciation</b>																			
2	0.03750	1		164,219											164,219	49,162	115,058	45,131	45,131
3	0.07219	2		316,132	-										316,132	-	316,132	124,003	169,134
4	0.06677	3		292,397	-										292,397	-	292,397	114,693	283,827
5	0.06177	4		270,501	-	-									270,501	-	270,501	106,104	389,931
6	0.05713	5		250,182	-	-	-								250,182	-	250,182	98,134	488,065
7	0.05285	6		231,439	-	-	-	-							231,439	-	231,439	90,782	578,847
8	0.04888	7		214,053	-	-	-	-	-						214,053	-	214,053	83,962	662,809
9	0.04522	8		198,026	-	-	-	-	-	-					198,026	-	198,026	77,676	740,485
10	0.04462	9		195,398	-	-	-	-	-	-	-				195,398	-	195,398	76,645	817,130
11	0.04461	10		195,354	-	-	-	-	-	-	-	-			195,354	-	195,354	76,628	893,758
12	0.04462	11		195,398	-	-	-	-	-	-	-	-	-		195,398	-	195,398	76,645	970,403
13	0.04461	12		195,354	-	-	-	-	-	-	-	-	-	-	195,354	-	195,354	76,628	1,047,031
14	0.04462	13		195,398	-	-	-	-	-	-	-	-	-	-	195,398	-	195,398	76,645	1,123,676
15	0.04461	14		195,354	-	-	-	-	-	-	-	-	-	-	195,354	-	195,354	76,628	1,200,304
16	0.04462	15		195,398	-	-	-	-	-	-	-	-	-	-	195,398	-	195,398	76,645	1,276,949
17	0.04461	16		195,354	-	-	-	-	-	-	-	-	-	-	195,354	-	195,354	76,628	1,353,577
18	0.04462	17		195,398	-	-	-	-	-	-	-	-	-	-	195,398	-	195,398	76,645	1,430,222
19	0.04461	18		195,354	-	-	-	-	-	-	-	-	-	-	195,354	-	195,354	76,628	1,506,850
20	0.04462	19		195,398	-	-	-	-	-	-	-	-	-	-	195,398	-	195,398	76,645	1,583,495
21	0.04461	20		195,354	-	-	-	-	-	-	-	-	-	-	195,354	-	195,354	76,628	1,660,123
22	0.02231	21		97,699	-	-	-	-	-	-	-	-	-	-	97,699	-	97,699	38,322	1,698,445
23					-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,698,445
24						-	-	-	-	-	-	-	-	-	-	-	-	-	-
25							-	-	-	-	-	-	-	-	-	-	-	-	-
26								-	-	-	-	-	-	-	-	-	-	-	-
27									-	-	-	-	-	-	-	-	-	-	-
28										-	-	-	-	-	-	-	-	-	-
29											-	-	-	-	-	-	-	-	-
30												-	-	-	-	-	-	-	-
31													-	-	-	-	-	-	-
32														-	-	-	-	-	-
33															-	-	-	-	-
34																-	-	-	-
35				4,379,160	-	-	-	-	-	-	-	-	-	-	4,379,160				

NOTES:  
1/ Source of \$264,557 - Pg. 5 of 12, Col. 2, Ln. 5.  
2/ Source of \$790,774 - Pg. 6 of 12, Cols. 4 & 6, Ln. 5.

**Witness: Skirtich**  
**D.T.E. 05-27**  
**Exh.BSG/JES-1**  
**Schedule JES-17**  
**Page 8 of 12**

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Property Tax**  
**SAMPLE**

<b><u>Ln.</u></b> <b><u>No.</u></b>	<b><u>Taxable</u></b> <b><u>Property</u></b> <b>(1)</b>	<b><u>Reference</u></b> <b>(2)</b>	<b><u>Detail</u></b> <b>(3)</b> <b>(\$)</b>	<b><u>Taxable</u></b> <b><u>Value</u></b> <b>(4)</b> <b>(\$)</b>
1	Gross Plant			
2	Mains	Pg. 4 of 12, Col. 6, Ln. 1	4,111,448	
3	Services	Pg. 4 of 12, Col. 6, Ln. 2	<u>8,888</u>	4,120,336
4	Reserve for Depreciation			
5	Mains	Pg. 5 of 12, Col. 5, Ln. 1	44,609	
6	Services	Pg. 5 of 12, Col. 5, Ln. 2	<u>230</u>	<u>44,839</u>
7	Total Taxable Value (Ln. 3 less Ln. 6)			4,075,497
8	Composite Tax Rate for Calendar Year			1.90%
9	Annualized Taxes			<u><u>77,434</u></u>



Witness: Skirtich  
 D.T.E. 05-27  
 Exh.BSG/JES-1  
 Schedule JES-17  
 Page 9 of 12

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Carrying Costs**  
**From In Service to Implementation of Rates**  
**SAMPLE**

<u>Ln. No.</u>	<u>Lag Period</u>	<u>Monthly Additions</u>	<u>Cumulative Additions</u>	<u>Monthly Cost of Capital</u>	<u>Cost</u>
	(1)	(2)	(3)	(4)	(5)
		(\$)	(\$)	(%)	(\$)
1	Jan.	-	-	1.09%	-
2	Feb.	-	-	1.09%	-
3	Mar.	-	-	1.09%	-
4	April	625,607	625,607	1.09%	6,819
5	May	625,607	1,251,214	1.09%	13,638
6	June	625,607	1,876,821	1.09%	20,457
7	July	625,607	2,502,428	1.09%	27,276
8	Aug.	625,607	3,128,035	1.09%	34,096
9	Sept.	625,607	3,753,642	1.09%	40,915
10	Oct.	625,521	4,379,163	1.09%	47,733
11	Nov.		4,379,163	1.09%	47,733
12	Dec.		4,379,163	1.09%	47,733
13	Jan.		4,379,163	1.09%	47,733
14	Feb.		4,379,163	1.09%	47,733
15	Mar.		4,379,163	1.09%	47,733
16	Apr.		4,379,163	1.09%	47,733
17	May		4,379,163	1.09%	47,733
18	June		4,379,163	1.09%	47,733
19	July		4,379,163	1.09%	47,733
20	Aug.		4,379,163	1.09%	47,733
21	Sept.		4,379,163	1.09%	47,733
22	Oct.		4,379,163	1.09%	47,733
23	Total				<u>572,798</u>

Witness: Skirtich  
 D.T.E. 05-27  
 Exh.BSG/JES-1  
 Schedule JES-17  
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Bay State Gas Company  
 SIR Base Rate Adjustment  
 Rate of Return  
 AS FILED IN D.T.E. 05-27

<u>Ln. No.</u>	<u>Item</u> (1)	<u>Capital Ratio</u> (2)	<u>Cost</u> (3)	<u>Weighted Cost</u> (4)	<u>Pre-Tax Cost</u> (5)
1	Debt	46.05%	6.18%	2.85%	2.85%
2	Equity	<u>53.95%</u>	<u>11.50%</u>	<u>6.20%</u>	<u>10.20%</u>
3	Total	100.00%		9.05%	13.05%

**Witness: Skirtich**  
**D.T.E. 05-27**  
**Exh.BSG/JES-1**  
**Schedule JES-17**  
**Page 11 of 12**

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**O&M Leak Repair Offset**  
**SAMPLE**

<b><u>Ln.</u></b> <b><u>No.</u></b>	<b><u>Description</u></b> <b>(1)</b>	<b><u>4 Year Avg.</u></b> <b>(2)</b>	<b><u>SIR</u></b> <b><u>Program Year 1/</u></b> <b>(3)</b>	<b><u>Difference</u></b> <b>(4 = 2 - 3)</b>	<b><u>Reference</u></b> <b>(5)</b>
1	Number of O&M Corrosion Leaks Repaired				
2	Mains	719	719	-	Pg. 12 of 12
3	Costs Per Corrosion Leak Repaired				
4	Mains (Pg. 12, Col. 6. Ln. 3)	\$1,021			Pg. 12 of 12
5	O&M Offset				
6	Mains (Col. 4, Ln. 2 x Col. 2, Ln. 4)		<u>\$0</u>		
7	Total Program Year O&M Leak Repair Offset		<u>\$0</u>		

**NOTES:**

1/ Source - Bay State Gas Company's Annual Department of Transportation Office of Pipeline Safety ("DOT") Report  
 - DOT Form RSPA F 7100.1-1, Part C.

**Witness: Skirtich**  
**D.T.E. 05-27**  
**Exh. BSG/JES-1**  
**Schedule JES-17**  
**Page 12 of 12**

**Bay State Gas Company**  
**SIR Base Rate Adjustment**  
**Main Corrosion Leak Repair Costs and Volumes**  
**2000 through 2003**  
**ACTUAL**

<b><u>Ln.</u></b> <b><u>No.</u></b>	<b><u>Description</u></b> <b>(1)</b>	<b><u>2000</u></b> <b>(2)</b>	<b><u>2001</u></b> <b>(3)</b>	<b><u>2002</u></b> <b>(4)</b>	<b><u>2003</u></b> <b>(5)</b>	<b><u>Average</u></b> <b>(6)=(2 thru 5)/4</b>
1	Repair Costs for Main Corrosion Leaks 1/	\$ 816,215	\$ 708,330	\$ 595,902	\$ 819,575	\$ 735,006
2	Number of Main Corrosion Leaks Repaired 2/	804	686	613	771	719
3	Average Main Corrosion Repair Cost per Leak (Ln. 1 / Ln. 2)	\$ 1,015	\$ 1,033	\$ 972	\$ 1,063	\$ 1,021

**NOTES:**

1/ Source - Bay State Gas Company's Activity Based Costing (ABC) System

2/ Source - Bay State Gas Company's Annual Department of Transportation Office of Pipeline Safety ("DOT") Report - DOT Form RSPA F 7100.1-1, Part C.

Attachment DTE-3-34(b)  
Revised Schedule JAF-2-10  
1 of 6

[illegible]

**Bay State Gas Company**  
**Steel Infrastructure Replacement Step Adjustment**  
**Sample Calculation**

Attachment DTE-3-34(b)  
Revised Schedule JAF-2-10  
2 of 6

line	Description	C&I (51) Med. Annual Low Winter	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Company Total
1	<b><u>Rates Approved in DTE-05-27</u></b>						
2							
3	Monthly Customer Charge	\$65.00	\$213.00	\$213.00	\$781.00	\$781.00	
4	Winter Volumetric Rates						
5	First Block Rate	\$0.1774	\$0.1794	\$0.1682	\$0.0507	\$0.0507	
6	Second Block Rate						
7	Summer Volumetric Rates						
8	First Block Rate	\$0.0826	\$0.0778	\$0.0657	\$0.0193	\$0.0193	
9	Second Block Rate						
10	Demand Rate						
11	Winter	NA	NA	NA	\$2.16	\$2.16	
12	Summer	NA	NA	NA	\$0.67	\$0.67	
13							
14	<b><u>Billing Determinants</u></b>						
15							
16	<b>Number of Bills</b>						
17	Total - Annual	21,073	7,432	2,989	181	799	3,395,936
18	Total - Winter	10,718	3,662	1,530	92	410	1,702,116
19	Total - Summer	10,355	3,770	1,459	89	389	1,693,820
20							
21	<b>First Block Therms</b>						
22	Total First Block - Winter	12,740,904	36,806,379	14,756,628	7,211,204	28,655,953	
23	Total First Block- Summer	8,628,479	7,329,027	10,748,640	2,256,827	25,566,274	
24							
25	<b>Second Block Therms</b>						
26	Total Second Block - Winter	0	0	0	0	0	
27	Total Second Block- Summer	0	0	0	0	0	
28							
29	<b>Total Therms</b>						
30	Total Therms - Annual	21,369,383	44,135,406	25,505,268	9,468,031	54,222,227	493,498,312
31	Total Therms - Winter	12,740,904	36,806,379	14,756,628	7,211,204	28,655,953	
32	Total Therms - Summer	8,628,479	7,329,027	10,748,640	2,256,827	25,566,274	
33							
34	<b>Peak Day Therms</b>						
35	Total Peak Therms - Winter				342,526	1,388,815	
36	Total Peak Therms - Summer				103,257	1,184,822	
37							

Attachment DTE-3-34(b)  
Revised Schedule JAF-2-10  
3 of 6

		Residential Heating Total	Residential Heating 3	Residential R&T- Heating (4) Low-Income	Residential Non-Heating Total	Residential Non-Heating R&T-1	Residential Non-Heat (2) Low-Income	Outdoor Lighting	C&I (40) Annual High Winter	Low Annual Low Winter	C&I (50) Low Annual Low Winter	C&I (41) Med. Annual High Winter
38	<u>Revenue Generated</u>											
39	Monthly Customer Charge		\$29,648,303	\$1,351,381		\$4,413,812	\$125,088	\$371	\$3,803,914		\$758,252	\$3,652,675
40	Winter Volumetric Rates											
41	First Block Rate		\$39,802,003	\$812,894		\$373,664	\$14,662		\$6,952,816		\$876,231	\$8,930,431
42	Second Block Rate		\$13,321,118	\$0		\$366,468	\$0					
43	Summer Volumetric Rates											
44	First Block Rate		\$8,881,508	\$170,781		\$332,532	\$8,762		\$838,521		\$601,301	\$929,450
45	Second Block Rate		\$3,061,762	\$0		\$208,169	\$0					
46	Demand Rate											
47	Winter											
48	Summer											
49	TOTAL		\$94,714,695	\$2,335,056		\$5,694,645	\$148,511	\$371	\$11,595,251		\$2,235,784	\$13,512,556
50												
51	<u>Allocation Percentages</u>											
52												
53	Monthly Customer Charge		19.14%	0.87%		2.85%	0.08%	0.00%	2.46%		0.49%	2.36%
54	Winter Volumetric Rates											
55	First Block Rate		25.70%	0.52%		0.24%	0.01%	0.00%	4.49%		0.57%	5.77%
56	Second Block Rate		8.60%	0.00%		0.24%	0.00%	0.00%	0.00%		0.00%	0.00%
57	Summer Volumetric Rates											
58	First Block Rate		5.73%	0.11%		0.21%	0.01%	0.00%	0.54%		0.39%	0.60%
59	Second Block Rate		1.98%	0.00%		0.13%	0.00%	0.00%	0.00%		0.00%	0.00%
60	Demand Rate											
61	Winter											
62	Summer											
63	TOTAL		61.15%	1.51%		3.68%	0.10%	0.00%	7.49%		1.44%	8.72%
64												
65	<u>Revenue Increment</u>											
66	(Exh. BSG/JES-1; Sch. JES-17; page 1)											
67	Year One - 2004											
68	Year Two - N/A											
69	Total											
70												
71	<u>Allocated Revenue Increment</u>											
72												
73	Monthly Customer Charge		\$250,333	\$11,410		\$37,268	\$1,056	\$3	\$32,118		\$6,402	\$30,841
74	Winter Volumetric Rates											
75	First Block Rate		\$336,065	\$6,864		\$3,155	\$124		\$58,706		\$7,398	\$75,403
76	Second Block Rate		\$112,476	\$0		\$3,094	\$0					
77	Summer Volumetric Rates											
78	First Block Rate		\$74,990	\$1,442		\$2,808	\$74		\$7,080		\$5,077	\$7,848
79	Second Block Rate		\$25,852	\$0		\$1,758	\$0					
80	Demand Rate											
81	Winter											
82	Summer											
83	TOTAL		\$799,716	\$19,716		\$48,082	\$1,254	\$3	\$97,904		\$18,878	\$114,092
84												

**Bay State Gas Company**  
**Steel Infrastructure Replacement Step Adjustment**  
**Sample Calculation**

Attachment DTE-3-34(b)  
Revised Schedule JAF-2-10  
4 of 6

line	Description	C&I (51) Med. Annual Low Winter	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Company Total
38	<b><u>Revenue Generated</u></b>						
39	Monthly Customer Charge	\$1,369,745	\$1,583,016	\$636,657	\$141,361	\$624,019	
40	Winter Volumetric Rates						
41	First Block Rate	\$2,260,849	\$6,601,674	\$2,482,472	\$365,300	\$1,451,633	
42	Second Block Rate						
43	Summer Volumetric Rates						
44	First Block Rate	\$712,414	\$570,256	\$705,791	\$43,606	\$493,985	
45	Second Block Rate						
46	Demand Rate						
47	Winter				\$739,364	\$2,997,844	
48	Summer				\$69,320	\$795,411	
49	TOTAL	\$4,343,008	\$8,754,946	\$3,824,920	\$1,358,950	\$6,362,892	\$154,881,587
50							
51	<b><u>Allocation Percentages</u></b>						
52							
53	Monthly Customer Charge	0.88%	1.02%	0.41%	0.09%	0.40%	
54	Winter Volumetric Rates						
55	First Block Rate	1.46%	4.26%	1.60%	0.24%	0.94%	
56	Second Block Rate	0.00%	0.00%	0.00%	0.00%	0.00%	
57	Summer Volumetric Rates						
58	First Block Rate	0.46%	0.37%	0.46%	0.03%	0.32%	
59	Second Block Rate	0.00%	0.00%	0.00%	0.00%	0.00%	
60	Demand Rate						
61	Winter				0.48%	1.94%	
62	Summer				0.04%	0.51%	
63	TOTAL	2.80%	5.65%	2.47%	0.88%	4.11%	100.00%
64							
65	<b><u>Revenue Increment</u></b>						
66	(Exh. BSG/JES-1; Sch. JES-17; page 1)						
67	Year One - 2004						\$1,307,731
68	Year Two - N/A						\$0
69	Total						\$1,307,731
70							
71	<b><u>Allocated Revenue Increment</u></b>						
72							
73	Monthly Customer Charge	\$11,565	\$13,366	\$5,376	\$1,194	\$5,269	
74	Winter Volumetric Rates						
75	First Block Rate	\$19,089	\$55,741	\$20,961	\$3,084	\$12,257	
76	Second Block Rate						
77	Summer Volumetric Rates						
78	First Block Rate	\$6,015	\$4,815	\$5,959	\$368	\$4,171	
79	Second Block Rate						
80	Demand Rate						
81	Winter				\$6,243	\$25,312	
82	Summer				\$585	\$6,716	
83	TOTAL	\$36,670	\$73,922	\$32,295	\$11,474	\$53,725	\$1,307,731
84							



Attachment DTE-3-34(b)  
Revised Schedule JAF-2-10  
5 of 6

[illegible]

**Bay State Gas Company**  
**Steel Infrastructure Replacement Step Adjustment**  
**Sample Calculation**

Attachment DTE-3-34(b)  
Revised Schedule JAF-2-10  
6 of 6

line	Description	C&I (51) Med. Annual Low Winter	C&I (42) High Annual High Winter	C&I (52) High Annual Low Winter	C&I (43) Ex. High Ann. High Winter	C&I (53) Ex. High Ann. Low Winter	Company Total
85	<b><u>Incremental Charge</u></b>						
86							
87	Monthly Customer Charge	\$0.55	\$1.80	\$1.80	\$6.59	\$6.59	
88	Winter Volumetric Rates						
89	First Block Rate	\$0.0015	\$0.0015	\$0.0014	\$0.0004	\$0.0004	
90	Second Block Rate						
91	Summer Volumetric Rates						
92	First Block Rate	\$0.0007	\$0.0007	\$0.0006	\$0.0002	\$0.0002	
93	Second Block Rate						
94	Demand Rate						
95	Winter				\$0.02	\$0.02	
96	Summer				\$0.01	\$0.01	
97							
98	<b><u>Revised Rates</u></b>						
99							
100	Monthly Customer Charge	\$65.55	\$214.80	\$214.80	\$787.59	\$787.59	
101	Winter Volumetric Rates						
102	First Block Rate	\$0.1789	\$0.1809	\$0.1696	\$0.0511	\$0.0511	
103	Second Block Rate						
104	Summer Volumetric Rates						
105	First Block Rate	\$0.0833	\$0.0785	\$0.0662	\$0.0195	\$0.0195	
106	Second Block Rate						
107	Demand Rate						
108	Winter				\$2.18	\$2.18	
109	Summer				\$0.68	\$0.68	
110							
111	<b><u>Revenue Proof</u></b>						
112							
113	Monthly Customer Charge	\$1,381,310	\$1,596,382	\$642,033	\$142,555	\$629,288	
114	Winter Volumetric Rates						
115	First Block Rate	\$2,279,938	\$6,657,414	\$2,503,433	\$368,384	\$1,463,890	
116	Second Block Rate						
117	Summer Volumetric Rates						
118	First Block Rate	\$718,429	\$575,071	\$711,751	\$43,974	\$498,156	
119	Second Block Rate						
120	Demand Rate						
121	Winter				\$745,606	\$3,023,156	
122	Summer				\$69,905	\$802,127	
123	TOTAL	\$4,379,678	\$8,828,867	\$3,857,216	\$1,370,425	\$6,416,616	\$156,189,318
124	check						\$156,189,318

**BAY STATE GAS COMPANY**  
**Typical Residential Heating Bill (R-3)**

**Bill Impact analysis re: Steel Infrastructure Replacement (SIR)**  
**Base Rate Adjustment - Annual Rev. Requirement of \$1,307,731**

Typical Usage In Therms													Total	Total	Total					
Line No.	Residential Heating (R-3)				May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	May - Apr (13)	Off-Peak (14)	Peak (15)	
1					90	55	30	30	42	71	109	150	187	188	166	132	1,250	318	932	
2	Current Base Rates																			
3	Off-Peak																			
4	Cust. Chg				\$12.10	\$12.10	\$12.10	\$12.10	\$12.10	\$12.10							\$73	\$73		
5	First 30 therms @				\$0.3183	\$9.55	\$9.55	\$9.55	\$9.55	\$9.55							\$57	\$57		
6	Excess 30 therms @				\$0.2224	\$13.34	\$5.56	\$0.00	\$0.00	\$2.67	\$9.12							\$31	\$31	
7																				
8	Peak																			
9	Cust. Chg				\$12.10						\$12.10	\$12.10	\$12.10	\$12.10	\$12.10	\$12.10	\$73		\$73	
10	First 125 therms @				\$0.3183						\$34.70	\$39.79	\$39.79	\$39.79	\$39.79	\$39.79	\$234		\$234	
11	Excess 125 therms @				\$0.2224						\$0.00	\$5.56	\$13.79	\$14.01	\$9.12	\$1.56	\$44		\$44	
12																				
13	Revised Base Rates																			
14	Off-Peak																			
15	Cust. Chg				\$12.20	\$12.20	\$12.20	\$12.20	\$12.20	\$12.20							\$73	\$73		
16	First 30 therms @				\$0.3210	\$9.63	\$9.63	\$9.63	\$9.63	\$9.63							\$58	\$58		
17	Excess 30 therms @				\$0.2242	\$13.45	\$5.61	\$0.00	\$0.00	\$2.69	\$9.19							\$31	\$31	
18																				
19	Peak																			
20	Cust. Chg				\$12.20						\$12.20	\$12.20	\$12.20	\$12.20	\$12.20	\$12.20	\$73		\$73	
21	First 125 therms @				\$0.3210						\$34.99	\$40.13	\$40.13	\$40.13	\$40.13	\$40.13	\$236		\$236	
22	Excess 125 therms @				\$0.2242						\$0.00	\$5.61	\$13.90	\$14.13	\$9.19	\$1.57	\$44		\$44	
23																				
24	Test Year Total Base Rate Amount				\$34.99	\$27.21	\$21.65	\$21.65	\$24.32	\$30.77	\$46.80	\$57.45	\$65.68	\$65.90	\$61.01	\$53.45	\$511	\$161	\$350	
25	Revised Total Base Rate Amount				\$35.28	\$27.44	\$21.83	\$21.83	\$24.52	\$31.02	\$47.19	\$57.93	\$66.23	\$66.45	\$61.52	\$53.89	\$515	\$162	\$353	
26																				
27	Test Year																			
28	CGA Rates - (Seasonal)				\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454				
29	LDAF				\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0251	\$0.0251	\$0.0251	\$0.0251	\$0.0251	\$0.0251				
30																				
31	Revised																			
32	CGA Rates - (Seasonal)				\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454				
33	LDAF				\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0270	\$0.0251	\$0.0251	\$0.0251	\$0.0251	\$0.0251	\$0.0251				
34																				
35	Test Year				\$118.94	\$78.51	\$49.63	\$49.63	\$63.49	\$96.99	\$152.58	\$203.02	\$247.16	\$248.35	\$222.11	\$181.55	\$1,712	\$457	\$1,255	
36	Revised				\$119.23	\$78.73	\$49.81	\$49.81	\$63.69	\$97.24	\$152.97	\$203.51	\$247.71	\$248.90	\$222.62	\$182.00	\$1,716	\$459	\$1,258	
37	Difference				\$0.29	\$0.23	\$0.18	\$0.18	\$0.20	\$0.25	\$0.39	\$0.48	\$0.55	\$0.55	\$0.51	\$0.45	\$4	\$1	\$3	
38																				
39	% Chg				0.24%	0.29%	0.36%	0.36%	0.32%	0.26%	0.26%	0.24%	0.22%	0.22%	0.23%	0.25%	0.25%	0.29%	0.23%	
40																				
41	Average monthly impact																\$ 0.36	\$ 0.22	\$ 0.49	

**BAY STATE GAS COMPANY**  
**Typical Residential Non-Heating Bill (R-1)**

**Bill Impact analysis re: Steel Infrastructure Replacement (SIR)**  
**Base Rate Adjustment - Annual Rev. Requirement of \$1,307,731**

**Typical Usage In Therms**

Line No.	Residential Non-Heating (R-1)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	Total May - Apr (13)	Total Off-Peak (14)	Total Peak (15)
1		17	17	15	14	7	15	15	18	19	20	19	19	195	85	110
2	<b>Current Base Rates</b>															
3	Off-Peak															
4	Cust. Chg	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60							\$70	\$70	
5	First 10 therms @	\$0.2393	\$2.39	\$2.39	\$2.39	\$2.39	\$1.68	\$2.39						\$14	\$14	
6	Excess 10 therms @	\$0.1928	\$1.35	\$1.35	\$0.96	\$0.77	\$0.00	\$0.96						\$5	\$5	
7																
8	Peak															
9	Cust. Chg	\$11.60						\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$11.60	\$70		\$70
10	First 12 therms @	\$0.2393						\$2.87	\$2.87	\$2.87	\$2.87	\$2.87	\$2.87	\$17		\$17
11	Excess 12 therms @	\$0.1928						\$0.58	\$1.16	\$1.35	\$1.54	\$1.35	\$1.35	\$7		\$7
12																
13	<b>Revised Base Rates</b>															
14	Off-Peak															
15	Cust. Chg	\$11.70	\$11.70	\$11.70	\$11.70	\$11.70	\$11.70							\$70	\$70	
16	First 10 therms @	\$0.2414	\$2.41	\$2.41	\$2.41	\$2.41	\$1.69	\$2.41						\$14	\$14	
17	Excess 10 therms @	\$0.1945	\$1.36	\$1.36	\$0.97	\$0.78	\$0.00	\$0.97						\$5	\$5	
18																
19	Peak															
20	Cust. Chg	\$11.70						\$11.70	\$11.70	\$11.70	\$11.70	\$11.70	\$11.70	\$70		\$70
21	First 12 therms @	\$0.2414						\$2.90	\$2.90	\$2.90	\$2.90	\$2.90	\$2.90	\$17		\$17
22	Excess 12 therms @	\$0.1945						\$0.58	\$1.17	\$1.36	\$1.56	\$1.36	\$1.36	\$7		\$7
23																
24	Test Year Total Base Rate Amount	\$15.34	\$15.34	\$14.96	\$14.76	\$13.28	\$14.96	\$15.05	\$15.63	\$15.82	\$16.01	\$15.82	\$15.82	\$183	\$89	\$94
25	Revised Total Base Rate Amount	\$15.48	\$15.48	\$15.09	\$14.89	\$13.39	\$15.09	\$15.18	\$15.76	\$15.96	\$16.15	\$15.96	\$15.96	\$184	\$89	\$95
26																
27	<b>Test Year</b>															
28	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
29	LDAF	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0169	\$0.0169	\$0.0169	\$0.0169	\$0.0169	\$0.0169			
30																
31	<b>Revised</b>															
32	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
33	LDAF	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0238	\$0.0169	\$0.0169	\$0.0169	\$0.0169	\$0.0169	\$0.0169			
34																
35	<b>Test Year</b>	\$30.93	\$30.93	\$28.71	\$27.60	\$19.69	\$28.71	\$28.99	\$32.36	\$33.48	\$34.60	\$33.48	\$33.48	\$363	\$167	\$196
36	<b>Revised</b>	\$31.07	\$31.07	\$28.84	\$27.73	\$19.81	\$28.84	\$29.12	\$32.50	\$33.62	\$34.74	\$33.62	\$33.62	\$365	\$167	\$197
37	<b>Difference</b>	\$0.13	\$0.13	\$0.13	\$0.13	\$0.11	\$0.13	\$0.13	\$0.14	\$0.14	\$0.14	\$0.14	\$0.14	\$2	\$1	\$1
38																
39	% Chg	0.43%	0.43%	0.45%	0.46%	0.58%	0.45%	0.45%	0.42%	0.41%	0.40%	0.41%	0.41%	0.44%	0.46%	0.42%
40																
41	Average monthly impact													\$ 0.13	\$ 0.13	\$ 0.14

**BAY STATE GAS COMPANY**  
**Typical C&I Low Annual/Low Winter (G-50)**

**Bill Impact analysis re: Steel Infrastrucure Replacement (SIR)**  
**Base Rate Adjustment - Annual Rev. Requirement of \$1,307,731**

**Typical Usage In Therms**

Line No.	C&I Low Annual/Low Winter (G-50)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	Total May - Apr (13)	Total Off-Peak (14)	Total Peak (15)
1		125	105	101	93	99	119	172	172	202	199	200	166	1,753	642	1,111
2	<b>Current Base Rates</b>															
3	Off-Peak															
4	Cust. Chg	\$19.00	\$19.00	\$19.00	\$19.00	\$19.00	\$19.00							\$114	\$114	
5	First 99999 therms @	\$0.2818	\$35.23	\$29.59	\$28.46	\$26.21	\$27.90							\$181	\$181	
6	Excess 99999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0	
7																
8	Peak															
9	Cust. Chg	\$19.00						\$19.00	\$19.00	\$19.00	\$19.00	\$19.00	\$19	\$114		\$114
10	First 99999 therms @	\$0.2818						\$48.47	\$48.47	\$56.92	\$56.08	\$56.36	\$47	\$313		\$313
11	Excess 99999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0	\$0		\$0
12																
13	<b>Revised Base Rates</b>															
14	Off-Peak															
15	Cust. Chg	\$19.16	\$19.16	\$19.16	\$19.16	\$19.16	\$19.16							\$115	\$115	
16	First 99999 therms @	\$0.2841	\$35.51	\$29.83	\$28.69	\$26.42	\$28.13							\$182	\$182	
17	Excess 99999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0	
18																
19	Peak															
20	Cust. Chg	\$19.16						\$19.16	\$19.16	\$19.16	\$19.16	\$19.16	\$19	\$115		\$115
21	First 99999 therms @	\$0.2841						\$48.87	\$48.87	\$57.39	\$56.54	\$56.82	\$47.16	\$316		\$316
22	Excess 99999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
23																
24	Test Year Total Base Rate Amount	\$54.23	\$48.59	\$47.46	\$45.21	\$46.90	\$52.53	\$67.47	\$67.47	\$75.92	\$75.08	\$75.36	\$66	\$722	\$295	\$427
25	Revised Total Base Rate Amount	\$54.67	\$48.99	\$47.85	\$45.58	\$47.29	\$52.97	\$68.03	\$68.03	\$76.55	\$75.70	\$75.98	\$66.32	\$728	\$297	\$431
26																
27	<b>Test Year</b>															
28	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
29	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
30																
31	<b>Revised</b>															
32	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
33	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
34																
35	<b>Test Year</b>	\$169.85	\$145.71	\$140.89	\$131.23	\$138.47	\$162.61	\$228.44	\$228.44	\$264.98	\$261.32	\$262.54	\$221.14	\$2,356	\$889	\$1,467
36	<b>Revised</b>	<u>\$170.30</u>	<u>\$146.12</u>	<u>\$141.28</u>	<u>\$131.61</u>	<u>\$138.86</u>	<u>\$163.04</u>	<u>\$229.00</u>	<u>\$229.00</u>	<u>\$265.60</u>	<u>\$261.94</u>	<u>\$263.16</u>	<u>\$222</u>	<u>\$2,362</u>	<u>\$891</u>	<u>\$1,470</u>
37	<b>Difference</b>	\$0.45	\$0.40	\$0.39	\$0.37	\$0.39	\$0.43	\$0.56	\$0.56	\$0.62	\$0.62	\$0.62	\$0.54	\$6	\$2	\$4
38																
39	% Chg	0.26%	0.28%	0.28%	0.28%	0.28%	0.27%	0.24%	0.24%	0.24%	0.24%	0.24%	0.25%	0.25%	0.27%	0.24%
40																
41	Average monthly impact													\$ 0.50	\$ 0.41	\$ 0.59

**BAY STATE GAS COMPANY**  
**Typical C&I Low Annual/High Winter (G-40)**

**Bill Impact analysis re: Steel Infrastructure Replacement (SIR)**  
**Base Rate Adjustment - Annual Rev. Requirement of \$1,307,731**

**Typical Usage In Therms**

Line No.	C&I Low Annual/High Winter (G-40)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	Total May - Apr (13)	Total Off-Peak (14)	Total Peak (15)
1		84	38	25	24	25	49	103	216	300	300	271	169	1,604	245	1,359
2	<b>Current Base Rates</b>															
3	Off-Peak															
4	Cust. Chg	\$19.00	\$19.00	\$19.00	\$19.00	\$19.00	\$19.00							\$114	\$114	
5	First 99999 therms @	\$0.3090	\$25.96	\$11.74	\$7.73	\$7.42	\$7.73	\$15.14						\$76	\$76	
6	Excess 99999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00						\$0	\$0	
7																
8	Peak															
9	Cust. Chg	\$19.00						\$19.00	\$19.00	\$19.00	\$19.00	\$19.00	\$19.00	\$114		\$114
10	First 99999 therms @	\$0.3090						\$31.83	\$66.74	\$92.70	\$92.70	\$83.74	\$52.22	\$420		\$420
11	Excess 99999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
12																
13	<b>Revised Base Rates</b>															
14	Off-Peak															
15	Cust. Chg	\$19.16	\$19.16	\$19.16	\$19.16	\$19.16	\$19.16							\$115	\$115	
16	First 99999 therms @	\$0.3117	\$26.18	\$11.85	\$7.79	\$7.48	\$7.79	\$15.27						\$76	\$76	
17	Excess 99999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00						\$0	\$0	
18																
19	Peak															
20	Cust. Chg	\$19.16						\$19.16	\$19.16	\$19.16	\$19.16	\$19.16	\$19.16	\$115		\$115
21	First 99999 therms @	\$0.3117						\$32.11	\$67.33	\$93.51	\$93.51	\$84.47	\$52.68	\$424		\$424
22	Excess 99999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
23																
24	Test Year Total Base Rate Amount	\$44.96	\$30.74	\$26.73	\$26.42	\$26.73	\$34.14	\$50.83	\$85.74	\$111.70	\$111.70	\$102.74	\$71.22	\$724	\$190	\$534
25	Revised Total Base Rate Amount	\$45.34	\$31.01	\$26.95	\$26.64	\$26.95	\$34.43	\$51.27	\$86.49	\$112.67	\$112.67	\$103.63	\$71.84	\$730	\$191	\$539
26																
27	<b>Test Year</b>															
28	CGA Rates - (Seasonal)	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454			
29	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
30																
31	<b>Revised</b>															
32	CGA Rates - (Seasonal)	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454			
33	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
34																
35	<b>Test Year</b>	\$123.71	\$66.37	\$50.16	\$48.92	\$50.16	\$80.08	\$150.60	\$294.98	\$402.31	\$402.31	\$365.26	\$234.93	\$2,270	\$419	\$1,850
36	<b>Revised</b>	\$124.09	\$66.63	\$50.39	\$49.14	\$50.39	\$80.37	\$151.04	\$295.73	\$403.28	\$403.28	\$366.15	\$235.55	\$2,276	\$421	\$1,855
37	<b>Difference</b>	\$0.39	\$0.26	\$0.23	\$0.23	\$0.23	\$0.29	\$0.44	\$0.74	\$0.97	\$0.97	\$0.89	\$0.62	\$6	\$2	\$5
38																
39	% Chg	0.31%	0.40%	0.45%	0.46%	0.45%	0.36%	0.29%	0.25%	0.24%	0.24%	0.24%	0.26%	0.28%	0.39%	0.25%
40																
41	Average monthly impact													\$ 0.52	\$ 0.27	\$ 0.77

**BAY STATE GAS COMPANY**  
**Typical C&I Medium Annual/Low Winter (G-51)**

**Bill Impact analysis re: Steel Infrastructure Replacement (SIR)**  
**Base Rate Adjustment - Annual Rev. Requirement of \$1,307,731**

Typical Usage In Therms																
Line No.	C&I Medium Annual/Low Winter (G-51)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	Total May - Apr (13)	Total Off-Peak (14)	Total Peak (15)
1		790	794	763	726	731	807	941	1,210	1,364	1,294	1,321	1,078	11,819	4,611	7,208
2	Current Base Rates															
3	Off-Peak															
4	Cust. Chg	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00							\$390	\$390	
5	First 99999 therms @	\$0.0826	\$65.25	\$65.58	\$63.02	\$59.97	\$60.38	\$66.66						\$381	\$381	
6	Excess 99999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0	
7																
8	Peak															
9	Cust. Chg	\$65.00						\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$390		\$390
10	First 99999 therms @	\$0.1774						\$166.93	\$214.65	\$241.97	\$229.56	\$234.35	\$191.24	\$1,279		\$1,279
11	Excess 99999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
12																
13	Revised Base Rates															
14	Off-Peak															
15	Cust. Chg	\$65.55	\$65.55	\$65.55	\$65.55	\$65.55	\$65.55							\$393	\$393	
16	First 99999 therms @	\$0.0833	\$65.81	\$66.14	\$63.56	\$60.48	\$60.89	\$67.22						\$384	\$384	
17	Excess 99999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0	
18																
19	Peak															
20	Cust. Chg	\$65.55						\$65.55	\$65.55	\$65.55	\$65.55	\$65.55	\$65.55	\$393		\$393
21	First 99999 therms @	\$0.1789						\$168.35	\$216.47	\$244.02	\$231.50	\$236.33	\$192.85	\$1,290		\$1,290
22	Excess 99999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
23																
24	Test Year Total Base Rate Amount	\$130.25	\$130.58	\$128.02	\$124.97	\$125.38	\$131.66	\$231.93	\$279.65	\$306.97	\$294.56	\$299.35	\$256.24	\$2,440	\$771	\$1,669
25	Revised Total Base Rate Amount	\$131.36	\$131.69	\$129.11	\$126.03	\$126.44	\$132.77	\$233.90	\$282.02	\$309.57	\$297.05	\$301.88	\$258.40	\$2,460	\$777	\$1,683
26																
27	Test Year															
28	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
29	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
30																
31	Revised															
32	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
33	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
34																
35	Test Year	\$861.00	\$865.03	\$833.80	\$796.52	\$801.56	\$878.13	\$1,112.61	\$1,412.09	\$1,583.54	\$1,505.61	\$1,535.67	\$1,265.14	\$13,451	\$5,036	\$8,415
36	Revised	\$862.11	\$866.14	\$834.88	\$797.58	\$802.62	\$879.25	\$1,114.58	\$1,414.46	\$1,586.14	\$1,508.10	\$1,538.20	\$1,267.30	\$13,471	\$5,043	\$8,429
37	Difference	\$1.10	\$1.11	\$1.08	\$1.06	\$1.06	\$1.12	\$1.96	\$2.37	\$2.60	\$2.49	\$2.53	\$2.17	\$21	\$7	\$14
38																
39	% Chg	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.18%	0.17%	0.16%	0.17%	0.16%	0.17%	0.15%	0.13%	0.17%
40																
41	Average monthly impact													\$ 1.72	\$ 1.09	\$ 2.35

**BAY STATE GAS COMPANY**  
**Typical C&I Medium Annual/High Winter (G-41)**

Bill Impact analysis re: Steel Infrastructure Replacement (SIR)  
Base Rate Adjustment - Annual Rev. Requirement of \$1,307,731

Typical Usage In Therms														Total	Total	Total
Line No.	C&I Medium Annual/High Winter (G-41)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	May - Apr (13)	Off-Peak (14)	Peak (15)
1		665	302	164	146	174	374	824	2,139	2,170	2,294	1,971	1,270	12,493	1,825	10,668
2	<b>Current Base Rates</b>															
3	Off-Peak															
4	Cust. Chg	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00							\$390	\$390	
5	First 99999 therms @	\$0.1216	\$80.86	\$36.72	\$19.94	\$17.75	\$21.16	\$45.48						\$222	\$222	
6	Excess 99999 therms @	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0	
7																
8	Peak															
9	Cust. Chg	\$65.00						\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$65.00	\$390		\$390
10	First 99999 therms @	\$0.1920						\$158.21	\$410.69	\$416.64	\$440.45	\$378.43	\$243.84	\$2,048		\$2,048
11	Excess 99999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
12																
13	<b>Revised Base Rates</b>															
14	Off-Peak															
15	Cust. Chg	\$65.55	\$65.55	\$65.55	\$65.55	\$65.55	\$65.55							\$393	\$393	
16	First 99999 therms @	\$0.1227	\$81.60	\$37.06	\$20.12	\$17.91	\$21.35	\$45.89						\$224	\$224	
17	Excess 99999 therms @	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0	
18																
19	Peak															
20	Cust. Chg	\$65.55						\$65.55	\$65.55	\$65.55	\$65.55	\$65.55	\$65.55	\$393		\$393
21	First 99999 therms @	\$0.1936						\$159.53	\$414.11	\$420.11	\$444.12	\$381.59	\$245.87	\$2,065		\$2,065
22	Excess 99999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
23																
24	Test Year Total Base Rate Amount	\$145.86	\$101.72	\$84.94	\$82.75	\$86.16	\$110.48	\$223.21	\$475.69	\$481.64	\$505.45	\$443.43	\$308.84	\$3,050	\$612	\$2,438
25	Revised Total Base Rate Amount	\$147.15	\$102.61	\$85.67	\$83.46	\$86.90	\$111.44	\$225.08	\$479.66	\$485.66	\$509.67	\$447.14	\$311.42	\$3,076	\$617	\$2,459
26																
27	<b>Test Year</b>															
28	CGA Rates - (Seasonal)	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454			
29	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
30																
31	<b>Revised</b>															
32	CGA Rates - (Seasonal)	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454			
33	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
34																
35	<b>Test Year</b>	\$769.30	\$384.85	\$238.69	\$219.63	\$249.28	\$461.10	\$1,021.42	\$2,547.74	\$2,583.72	\$2,727.65	\$2,352.74	\$1,539.09	\$15,095	\$2,323	\$12,772
36	<b>Revised</b>	<u>\$770.58</u>	<u>\$385.73</u>	<u>\$239.42</u>	<u>\$220.34</u>	<u>\$250.03</u>	<u>\$462.07</u>	<u>\$1,023.28</u>	<u>\$2,551.71</u>	<u>\$2,587.74</u>	<u>\$2,731.87</u>	<u>\$2,356.44</u>	<u>\$1,541.67</u>	<u>\$15,121</u>	<u>\$2,328</u>	<u>\$12,793</u>
37	<b>Difference</b>	\$1.28	\$0.88	\$0.73	\$0.71	\$0.74	\$0.96	\$1.87	\$3.97	\$4.02	\$4.22	\$3.70	\$2.58	\$26	\$5	\$20
38																
39	% Chg	0.17%	0.23%	0.31%	0.32%	0.30%	0.21%	0.18%	0.16%	0.16%	0.15%	0.16%	0.17%	0.17%	0.23%	0.16%
40																
41	Average monthly impact													\$ 2.14	\$ 0.88	\$ 3.39



**BAY STATE GAS COMPANY**  
**Typical C&I High Annual/Low Winter (G-52)**

Bill Impact analysis re: Steel Infrastructure Replacement (SIR)  
Base Rate Adjustment - Annual Rev. Requirement of \$1,307,731

Typical Usage In Therms														Total	Total	Total
Line No.	C&I High Annual/Low Winter (G-52)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	May - Apr (13)	Off-Peak (14)	Peak (15)
1		11,042	10,120	9,172	8,320	9,745	11,262	12,094	14,442	17,547	16,095	15,704	14,183	149,726	59,661	90,065
2	<b>Current Base Rates</b>															
3	Off-Peak															
4	Cust. Chg	\$213.00	\$213.00	\$213.00	\$213.00	\$213.00	\$213.00							\$1,278	\$1,278	
5	First 999999 therms @	\$0.0657	\$725.46	\$664.88	\$602.60	\$546.62	\$640.25	\$739.91						\$3,920	\$3,920	
6	Excess 999999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00						\$0	\$0	
7																
8	Peak															
9	Cust. Chg	\$213.00						\$213.00	\$213.00	\$213.00	\$213.00	\$213.00	\$213.00	\$1,278		\$1,278
10	First 999999 therms @	\$0.1682						\$2,034.21	\$2,429.14	\$2,951.41	\$2,707.18	\$2,641.41	\$2,385.58	\$15,149		\$15,149
11	Excess 999999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
12																
13	<b>Revised Base Rates</b>															
14	Off-Peak															
15	Cust. Chg	\$214.80	\$214.80	\$214.80	\$214.80	\$214.80	\$214.80							\$1,289	\$1,289	
16	First 999999 therms @	\$0.0662	\$730.98	\$669.94	\$607.19	\$550.78	\$645.12	\$745.54						\$3,950	\$3,950	
17	Excess 999999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00						\$0	\$0	
18																
19	Peak															
20	Cust. Chg	\$214.80						\$214.80	\$214.80	\$214.80	\$214.80	\$214.80	\$214.80	\$1,289		\$1,289
21	First 999999 therms @	\$0.1696						\$2,051.14	\$2,449.36	\$2,975.97	\$2,729.71	\$2,663.40	\$2,405.44	\$15,275		\$15,275
22	Excess 999999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
23																
24	Test Year Total Base Rate Amount	\$938.46	\$877.88	\$815.60	\$759.62	\$853.25	\$952.91	\$2,247.21	\$2,642.14	\$3,164.41	\$2,920.18	\$2,854.41	\$2,598.58	\$21,625	\$5,198	\$16,427
25	Revised Total Base Rate Amount	\$945.78	\$884.74	\$821.99	\$765.58	\$859.92	\$960.34	\$2,265.94	\$2,664.16	\$3,190.77	\$2,944.51	\$2,878.20	\$2,620.24	\$21,802	\$5,238	\$16,564
26																
27	<b>Test Year</b>															
28	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
29	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
30																
31	<b>Revised</b>															
32	CGA Rates - (Seasonal)	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.8932	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126	\$0.9126			
33	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
34																
35	<b>Test Year</b>	\$11,152.31	\$10,238.88	\$9,299.70	\$8,455.62	\$9,867.37	\$11,370.26	\$13,565.99	\$16,158.41	\$19,586.64	\$17,983.49	\$17,551.79	\$15,872.45	\$161,103	\$60,384	\$100,719
36	<b>Revised</b>	\$11,159.63	\$10,245.74	\$9,306.09	\$8,461.58	\$9,874.04	\$11,377.69	\$13,584.72	\$16,180.43	\$19,613.01	\$18,007.82	\$17,575.57	\$15,894.11	\$161,280	\$60,425	\$100,856
37	<b>Difference</b>	\$7.32	\$6.86	\$6.39	\$5.96	\$6.67	\$7.43	\$18.73	\$22.02	\$26.37	\$24.33	\$23.78	\$21.66	\$178	\$41	\$137
38																
39	% Chg	0.07%	0.07%	0.07%	0.07%	0.07%	0.07%	0.14%	0.14%	0.13%	0.14%	0.14%	0.14%	0.11%	0.07%	0.14%
40																
41	Average monthly impact													\$ 14.79	\$ 6.77	\$ 22.81

**BAY STATE GAS COMPANY**  
**Typical C&I High Annual/High Winter (G-42)**

Bill Impact analysis re: Steel Infrastructure Replacement (SIR)  
Base Rate Adjustment - Annual Rev. Requirement of \$1,307,731

**Typical Usage In Therms**

Line No.	C&I High Annual/High Winter (G-42)	May (1)	Jun (2)	Jul (3)	Aug (4)	Sep (5)	Oct (6)	Nov (7)	Dec (8)	Jan (9)	Feb (10)	Mar (11)	Apr (12)	Total May - Apr (13)	Total Off-Peak (14)	Total Peak (15)
1		4,642	2,353	2,618	1,332	2,227	2,937	7,027	12,107	13,541	13,233	12,504	8,364	82,885	16,109	66,776
2	<b>Current Base Rates</b>															
3	Off-Peak															
4	Cust. Chg	\$213.00	\$213.00	\$213.00	\$213.00	\$213.00	\$213.00							\$1,278	\$1,278	
5	First 999999 therms @	\$0.0778	\$361.15	\$183.06	\$203.68	\$103.63	\$173.26	\$228.50						\$1,253	\$1,253	
6	Excess 999999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0	
7																
8	Peak															
9	Cust. Chg	\$213.00						\$213.00	\$213.00	\$213.00	\$213.00	\$213.00	\$213.00	\$1,278		\$1,278
10	First 999999 therms @	\$0.1794						\$1,260.64	\$2,172.00	\$2,429.26	\$2,374.00	\$2,243.22	\$1,500.50	\$11,980		\$11,980
11	Excess 999999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
12																
13	<b>Revised Base Rates</b>															
14	Off-Peak															
15	Cust. Chg	\$214.80	\$214.80	\$214.80	\$214.80	\$214.80	\$214.80							\$1,289	\$1,289	
16	First 999999 therms @	\$0.0785	\$364.40	\$184.71	\$205.51	\$104.56	\$174.82	\$230.56						\$1,265	\$1,265	
17	Excess 999999 therms @		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00							\$0	\$0	
18																
19	Peak															
20	Cust. Chg	\$214.80						\$214.80	\$214.80	\$214.80	\$214.80	\$214.80	\$214.80	\$1,289		\$1,289
21	First 999999 therms @	\$0.1809						\$1,271.18	\$2,190.16	\$2,449.57	\$2,393.85	\$2,261.97	\$1,513.05	\$12,080		\$12,080
22	Excess 999999 therms @							\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0		\$0
23																
24	Test Year Total Base Rate Amount	\$574.15	\$396.06	\$416.68	\$316.63	\$386.26	\$441.50	\$1,473.64	\$2,385.00	\$2,642.26	\$2,587.00	\$2,456.22	\$1,713.50	\$15,789	\$2,531	\$13,258
25	Revised Total Base Rate Amount	\$579.20	\$399.51	\$420.31	\$319.36	\$389.62	\$445.36	\$1,485.98	\$2,404.96	\$2,664.37	\$2,608.65	\$2,476.77	\$1,727.85	\$15,922	\$2,553	\$13,369
26																
27	<b>Test Year</b>															
28	CGA Rates - (Seasonal)	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454			
29	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
30																
31	<b>Revised</b>															
32	CGA Rates - (Seasonal)	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9057	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454	\$0.9454			
33	LDAF	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0318	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233	\$0.0233			
34																
35	<b>Test Year</b>	\$4,926.02	\$2,602.00	\$2,871.06	\$1,565.38	\$2,474.07	\$3,194.94	\$8,280.70	\$14,113.05	\$15,759.42	\$15,405.81	\$14,568.84	\$9,815.71	\$95,577	\$17,633	\$77,944
36	<b>Revised</b>	<u>\$4,931.07</u>	<u>\$2,605.45</u>	<u>\$2,874.69</u>	<u>\$1,568.11</u>	<u>\$2,477.43</u>	<u>\$3,198.79</u>	<u>\$8,293.04</u>	<u>\$14,133.01</u>	<u>\$15,781.53</u>	<u>\$15,427.46</u>	<u>\$14,589.40</u>	<u>\$9,830.05</u>	<u>\$95,710</u>	<u>\$17,656</u>	<u>\$78,054</u>
37	<b>Difference</b>	\$5.05	\$3.45	\$3.63	\$2.73	\$3.36	\$3.86	\$12.34	\$19.96	\$22.11	\$21.65	\$20.56	\$14.35	\$133	\$22	\$111
38																
39	% Chg	0.10%	0.13%	0.13%	0.17%	0.14%	0.12%	0.15%	0.14%	0.14%	0.14%	0.14%	0.15%	0.14%	0.13%	0.14%
40																
41	Average monthly impact													\$ 11.09	\$ 3.68	\$ 18.49

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
SEVENTH SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

DTE-7-1      Please refer to Exh. BSG/DGC-1 at 58 - 63. Discuss whether the Company currently contributes funds to GTI. If yes, provide copies of all internal analyses, memoranda, emails and all other relevant materials that led Bay State determine that participation in GTI's programs is beneficial to the Company's Massachusetts end users.

Response:    The only funding that Bay State has contributed to GTI are those associated with East Coast Distributor Funds, which ended in August of 2004. Bay State does not currently contribute to GTI.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
SEVENTH SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

DTE-7-2      Please indicate, providing adequate supporting documentation, the date  
Bay State began contributing to GTI's research activities.

Response:    East Coast Distributor Funds began in 1998 based on the settlement  
made between the East Coast Distributors and the Gas Research  
Institute (the predecessor to GTI).

COMMONWEALTH OF MASSACHUSETTS  
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DTE-7-3      Please quantify the benefits to-date that are derived from directly funding GTI's activities. Differentiate between benefits to end users versus benefits to shareholders.

Response:    GTI programs that Bay State has participated in are predominantly in the gas operations area. Benefits derived from these programs fall into three primary categories; 1) reduced operating cost; 2) increased efficiency; and 3) enhanced safety of employees and/or public. Benefits within these categories flow back to the ratepayer as these benefits mitigate the need for future rate increases.

Attached is a benefits analysis, which quantifies the benefits derived by funding GTI activities (See Attachment DTE-07-03).

GRI-04/0061

**Benefits of GRI RD&D Results  
That Have Been Placed in Commercial Use  
in 1999 Through 2003**

**Prepared by:**

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**May 2004**

**Abstract**

This report provides brief descriptions for sixteen new GRI RD&D products commercialized in 2003 and two enhancements of previously introduced products. The economic benefits are quantified for eighty-one items commercialized between 1999 and 2003 that are known to have produced significant economic benefits for their users. The calculated ratio of the benefits to gas customers to total GRI costs incurred in 1999 through the end of 2003 was 8.0 to 1.

### **Acknowledgments**

The author gratefully acknowledges the significant contribution provided by Irene D. Banas, senior engineer at the Energy Resources Center of the University of Illinois at Chicago, in evaluating the benefits of GRI's Exploration & Production, Pipeline and Distribution RD&D results.

## Introduction

Between January 1, 2003 and December 31, 2003, sixteen GRI RD&D results were placed in commercial service. In addition, enhanced versions of two previously commercialized items were placed in use\*. Those items are listed in Table 1, and brief descriptions of the eighteen items are included in Appendix A. With these new additions, some 133 GRI RD&D results have entered the commercial marketplace during the 5-year period between January 1999 and December 2003. The full list of the 133 items is included in Appendix B. As one measure of the value of the GRI RD&D program, the economic benefits accruing to users of 81 out of the 133 products can be compared to the total outlays of GRI during the past five years. This paper highlights the new GRI products that have entered the market during the past year and presents the results of the benefit-to-cost analysis of GRI's RD&D results during the past five years.

Notable additions to the list of GRI RD&D results placed in commercial service in 2003 include:

- Upgrades to the National Fuel Gas Code relating to the requirements for combustion air supply and corrugated gas vent connectors.
- A software tool to estimate critical information such as annual or monthly loads and costs associated with air-conditioning, heating, and on-site power generation for commercial buildings.
- A low-NO<sub>x</sub>, high-heat-transfer industrial burner that provides significantly higher heat transfer to furnace loads, higher furnace efficiency, and lower flame and combustion products temperature.
- Paralleling switchgear for distributed generation systems that reduces the barriers to installing gas-fired DG equipment.
- A report on the safety of vacuum excavation equipment used to remove soil from holes that are being dug by distribution companies.
- Evaluation of alternate methods for removing cyanide wastes from former manufactured gas plant sites.
- A chemical fingerprinting methodology for enhanced environmental forensic analysis to characterize complex manufactured gas plant wastes.
- A software package to evaluate potential adverse environmental effects of pipeline crossings of streams.
- Technology to improve the quality of the cement used to seal the annulus between the casing and surrounding rock in gas wells.
- Development of produced water atlases for 10 major gas-producing states and a handbook on actual produced water management practices and disposal economics for 26 basins.
- A comprehensive report on the gas potential of the Lewis shale formation of the San Juan Basin in Colorado and New Mexico.

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\* For tangible products (hardware, software) we interpret “commercialized” to mean that the product is commercially available, economically viable without subsidies, and has been sold in meaningful quantities. For the less tangible reports and other information products, we require that the products have been used in a commercial enterprise and have generated demonstrable economic benefits to the users. “Enhanced” products have been augmented in a commercially significant way, with or without GRI support. The augmentation may be a technical improvement in a product line, expansion of a product catalog, or expansion of the product market into new areas not available to the original product at its time of introduction.



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**Table 1. GRI RD&D Results That Have Been Placed in Commercial Use in 2003**

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**RESIDENTIAL**

1. Upgrades to the National Fuel Gas Code

**COMMERCIAL**

2. Building Energy Analyzer™

**INDUSTRIAL**

3. Low-NO<sub>x</sub> Combustion System for Glass Furnaces \*
4. Low-NO<sub>x</sub>, High-Heat-Transfer Burner
5. LNG Interchangeability in Burners

**POWER GENERATION**

6. Distributed Generation Switchgear
7. Guidebook to Gas-Fired Distributed Energy Technologies

**DISTRIBUTION**

8. Safety of Vacuum Excavation Operations
9. Gas Distribution Construction Guide
10. Removing Cyanide Wastes from MGP Sites
11. Chemical Fingerprinting for Enhanced Environmental Forensic Analysis

**PIPELINE**

12. Gas Leak Measurement Device (Hi-Flow® Sampler) \*
13. Environmental Effects of Pipeline Crossings of Streams
14. Standard for Coriolis Meters

**EXPLORATION AND PRODUCTION**

15. Cement Pulsation Technology
16. Analysis for Radium in Marine Sediments
17. Produced Water Atlases and Handbook
18. Gas Resource and Production Potential of the Lewis Shales

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\* Enhancement to a previous product.

## Benefits Results

Between January 1999 and December 2003, one hundred and thirty-three GRI RD&D results were placed in commercial service. The full list of the 133 items placed in commercial use is included in Appendix B. This report focuses on evaluating the benefits of 81 of the 133 GRI RD&D items that are known to have produced significant *quantifiable economic* benefits for their users. The 81 items are listed in Table 2. Benefits to product users in typical applications were calculated by comparing the economics of the GRI-sponsored products with the economics of products that would have been used in the absence of the GRI product. Product cost and performance data were obtained from product vendors, from field test results, or from product users. The measure of product benefit is the net present value of the incremental cash flow to the user (cost savings minus incremental cost) over the product lifetime using a real discount rate of 5% (above inflation). The GRI Baseline<sup>1</sup> national average projections of energy prices were used, when appropriate, to estimate cost savings. Total benefits were calculated by multiplying the unit benefits by the sales projected by product vendors from the first year in which the product was sold through 2008. The results are shown in Table 2. A range of product sales is shown to protect proprietary vendor sales projections.

As shown in Table 2, calculated economic benefits for the 81 items are estimated to be between \$3.4 and \$5.9 billion. Table 3 shows the expected value of benefits, at about \$4.9 billion, and the breakdown of the economic benefits by sector. We estimate that the 81 items account for most of the economic benefits that would be calculated for the entire set of 133 products. Omitted items often offer significant benefits to their users, but have not achieved widespread use as have the 81 high impact items. In addition, some of the omitted items are designed to produce benefits that are not easily expressed in economic terms. For example, RD&D results provide test methods for new gas equipment, technologies to meet existing or anticipated air emissions requirements, and information that is useful to the gas industry in developing gas resources and delivering the gas to consumers.

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<sup>1</sup> P.D. Holtberg, J.C. Cochener, "Baseline Projection Data Book: 2001 Edition of the GRI Baseline Projection of U.S. Energy Supply and Demand to 2020," GRI-01/0002.1 and GRI-01/0002.2, GRI, March 2001.

**Table 2. Summary of Benefits of GRI RD&D Results That Have Been Placed in Commercial Use in 1999 Through 2003**

	Sales or Applications Projected Through 2008 (in units)			Year of First Sale	Net Present Value of Benefits** (Million 2003\$)		
<hr/>							
<b>RESIDENTIAL</b>							
Upgrades to the National Gas Fuel Code	***			2003	\$62.5	to	\$109.3
<b>COMMERCIAL</b>							
kitchenCOST™ Software	545	to	1,000	1998/99	\$37.3	to	\$68.5
Modulating Indirect-Fired Make-Up Air Unit with Clean Modulation	1,800	to	3,300	1999	\$6.4	to	\$11.8
GATC: AERCO Benchmark Boiler	1,350	to	2,700	1999	\$26.5	to	\$53.0
PITCO Gas Fryers	75,000	to	138,000	1999	\$45.7	to	\$86.6
AUTOFRY™ Deep Fat Fryer	2,130	to	4,260	1999	\$8.1	to	\$16.2
York 600 RT 134a Chiller	60	to	95	2000	\$32.7	to	\$51.3
Tecogen 150 RT 134a Chiller	65	to	105	2000	\$2.2	to	\$3.6
<b>INDUSTRIAL</b>							
Process Application of Composite Radiant Tubes	39,600	to	68,600	1994/99	\$66.6	to	\$115.4
High Performance Infrared Burners	125	to	190	1995/00	\$612.27	to	\$918.40
Natural Gas Cofiring in Biomass-Fueled Stoker Boilers	13	to	20	1999	\$103.9	to	\$163.3
Ultra-Low-NOx Boiler Burner	120	to	180	1999	\$62.1	to	\$93.1
METHANE de-NOX® Reburn Technology	6	to	11	1999	\$136.2	to	\$233.5
Forced Convection Heater (FCH) Systems – Automotive	11	to	19	2000	\$14.2	to	\$23.6
Oscillating Combustion Burner	125	to	225	2001	\$17.0	to	\$30.4
Low-NO <sub>x</sub> Combustion System for Glass Furnaces	11	to	21	1995/03	\$69.7	to	\$127.9
Low-NO <sub>x</sub> , High-Heat-Transfer Burner	170	to	300	2003	\$31.6	to	\$56.5
<b>POWER GENERATION</b>							
IR PowerWorks Microturbine Cogeneration Systems	2,600	to	4,000	2000	\$50.2	to	\$78.9
Advanced High-Output Gas Engine-Generator (Caterpillar 3500® Series)	40	to	60	2001	\$12.6	to	\$21.6
Distributed Generation Switchgear	***			2003	\$3.0	to	\$4.7
<b>TRANSPORTATION</b>							
NGV Cylinders Types 1 and 2	28,500	to	69,700	1999	\$5.5	to	\$13.4
Advanced NGV Fueling Dispenser	80	to	170	2002	\$1.2	to	\$2.6
<b>DISTRIBUTION</b>							
Plastic Pipe Across (and on) Bridges	4,125	to	8,660	1995/99	\$63.2	to	\$132.8
DrillPath™ Software for Directional Drilling Operations	110	to	160	1996/99	\$2.4	to	\$3.6

	Sales or Applications Projected Through 2008 (in units)			Year of First Sale	Net Present Value of Benefits** (Million 2003\$)		
Starline® 2000 Renewal Technology	135,300	to	248,000	1999	\$1.9	to	\$3.5
Guided Mole	20	to	40	1999	\$4.6	to	\$8.0
Gas Holder Manual of Practice	7	to	12	1999	\$6.3	to	\$11.5
One-Step Paving	230	to	430	2000	\$3.4	to	\$6.7
Soil Compaction Supervisor	470	to	820	2000	\$19.4	to	\$33.9
Self-Loading, High-Efficiency Trailer for Coiled PE Pipe	22	to	43	2001	\$70.8	to	\$141.7
Cold-Mix Restoration of Pavement Cuts	130	to	330	2001	\$9.4	to	\$24.4
Imaging Underground Utility Structures	900	to	1,650	2001	\$6.4	to	\$11.7
Comparative Evaluation of PE Pipe Materials	55	to	110	2001	\$50.1	to	\$100.3
Directional Drilling for Plastic Pipe under Railroad Crossings	46	to	100	2001	\$12.6	to	\$27.2
PE LIFESPAN FORECASTING™	135	to	250	1994/01	\$83.7	to	\$154.9
Pipe Splitting Tool	15	to	30	1998/02	\$9.5	to	\$19.0
Gas Distribution Cost Database	450	to	800	2002	\$11.8	to	\$21.0
Assessment of PVC Pipe	4,300	to	9,500	2002	\$20.0	to	\$44.1
Plastic Pipe Informational Web Site	***			2002	\$4.3	to	\$7.9
Worker Exposure to Hazardous Substances	***			2002	\$5.4	to	\$16.2
Safety of Vacuum Excavation Operations	50	to	160	2003	\$2.6	to	\$8.3
Gas Distribution Construction Guide	22,500	to	54,000	2003	\$2.9	to	\$6.9
Removing Cyanide Wastes from MGP Sites	6	to	14	2003	\$4.6	to	\$11.9
Chemical Fingerprinting for Enhanced Environmental Forensic Analysis	185	to	290	2003	\$49.5	to	\$77.8
<b>PIPELINE</b>							
Breeze Haz™ Environment and Safety Offsite Consequence Modeling Software	3,000	to	5,300	1999	\$14.0	to	\$24.4
Emeritus Report B31.8 Code, Federal Pipeline Safety Regulations	***			2000	\$19.2	to	\$57.7
Elastic Wave Vehicle Tool	***			2000	\$67.6	to	\$146.5
API 14.1 Gas Sampling Standard.	5	to	11	2001	\$5.0	to	\$10.9
Ultrasonic Meter Installation Effects	2,500	to	5,000	2001	\$65.4	to	\$130.7
Orifice Meter Operational Effects	20	to	40	2001	\$38.0	to	\$70.7
DamageExpert™ Software	35	to	75	2001	\$61.4	to	\$133.0
Satellite Radar Interferometry Measurement of Slope Movement	20	to	45	2001	\$48.8	to	\$105.8
AIRCalc™ Software	145	to	265	2001	\$79.4	to	\$145.5
Predicting the Integrity of Storage Caverns in Thin Salt Beds	3	to	9	2002	\$0.4	to	\$1.2
ASME Standard for Pipeline Integrity Management	***			2002	\$5.0	to	\$10.8
NACE Standard for Direct Assessment of Pipeline Corrosion	***			2002	\$0.7	to	\$1.7
Reference Manuals of Best Practices for Horizontal Directional Drilling and its Effect in Wetlands	75	to	250	2002	\$2.0	to	\$6.5
Best Environmental Practices for Pipeline Construction	600	to	1,200	2002	\$2.6	to	\$5.2

	Sales or Applications Projected Through 2008 (in units)			Year of First Sale	Net Present Value of Benefits** (Million 2003\$)		
Gas Leak Measurement Device (Hi-Flow® Sampler)	30	to	120	2000/03	\$4.6	to	\$18.4
Environmental Effects of Pipeline Crossings of Streams	745	to	1,150	2003	\$45.4	to	\$71.3
Standard for Coriolis Meters	115	to	230	2003	\$6.2	to	\$12.4
<b>EXPLORATION AND PRODUCTION</b>							
Unconventional Natural Gas Database	110	to	190	1999/01	\$10.4	to	\$18.3
Downhole Gas/Water Separation CD-ROM	75	to	130	1999	\$8.8	to	\$15.2
Advanced Crosswell Seismic Source	200	to	400	1999	\$33.7	to	\$66.8
High Power VSP Mechanical Seismic Source	520	to	750	1999	\$25.4	to	\$37.0
Advanced Stimulation Technologies CD-ROM	45	to	80	1999	\$5.5	to	\$10.0
Coiled Tubing Standards	3	to	5	1999	\$15.7	to	\$30.3
GRI-MSTR™ Software and Report to Predict Toxicity of Produced Water Discharged to the Marine Environment	280	to	440	1999	\$12.5	to	\$19.7
Glycol Dehydrator Emissions Calculation Program - GLYCalc™ 4.0	720	to	1,330	1992/00	\$76.0	to	\$140.7
ProTreat™ Software for Amine Gas Treating Applications	45	to	75	2000	\$136.1	to	\$226.9
Cased Hole Resistivity Tool	800	to	1,300	2000	\$12.3	to	\$20.0
Cased Hole Pressure Tool	725	to	1,245	2000	\$106.5	to	\$182.6
Well Siting in Carbonates – EGI Report	90	to	140	2000	\$72.2	to	\$108.3
Portfolio of Emerging Natural Gas Resources – Rocky Mountain Basins	480	to	720	2000	\$110.6	to	\$165.9
Mercury Contamination Training Workshop	300	to	500	2000	\$3.0	to	\$5.1
New Gas Exploration Concepts	65	to	100	2001	\$280.8	to	\$441.2
StreamAnalyzer™ Software	370	to	820	2001	\$80.3	to	\$176.6
Enhanced Seismic Spectral Processor	200	to	330	2002	\$35.0	to	\$56.8
Cement Pulsation Technology	670	to	1,340	2003	\$23.9	to	\$47.9
Analysis for Radium in Marine Sediments	12	to	24	2003	\$3.3	to	\$6.6
Gas Resource and Production Potential of the Lewis Shales	45	to	70	2003	\$32.1	to	\$48.2
<b>TOTAL</b>					\$3,402		\$5,934
(million of 2003 dollars, 5% discount rate)							

\* Enhancement to a previous product for a new market application.

\*\* Net present value calculations based on a real discount rate of 5% (excluding inflation), stated in 2003 dollars.

\*\*\* Benefits are based on user feedback about technical and market influence of the RD&D items.

**Table 3. Total Expected Benefits by Sector**

	<b>Quantified GRI RD&amp;D Results</b>	<b>Net Present Value of Benefits (Million 2003\$)</b>
• Residential	1	\$104
• Commercial	7	\$256
• Industrial	9	\$1,360
• Power Generation	3	\$94
• Transportation	2	\$15
• Distribution	22	\$760
• Pipeline	17	\$772
• Exploration and Production	<u>20</u>	<u>\$1,582</u>
<b>TOTAL</b>	<b>81</b>	<b>\$4,943</b>

### **GRI RD&D Costs**

Between January 1999 and December 2003, GRI outlays totaled \$530 million. For comparison to the RD&D benefits calculated above, the cost cash flow stream was converted to an equivalent net present value lump sum expenditure at the beginning of 2003. As with the benefits calculation, a 5% real discount rate was used in the net present value calculation. The calculated equivalent cost was \$619 million. These costs include all outlays made by GRI during the past 5-year period, not just the costs incurred to produce the 133 RD&D products. Consequently, a portion of the calculated cost will yet generate benefits as additional products are commercialized in the future.

### **Benefit-to-Cost Ratio**

Dividing the calculated benefits by the costs results in a calculated benefit-to-cost ratio range of 5.5 : 1 to 9.6 : 1 (benefits of \$3.4 to \$5.9 billion divided by outlays of \$619 million) with an expected value of 8.0 : 1 (\$4.94 billion divided by \$619 million). In a similar analysis carried out in 2003 for RD&D items placed in commercial use between 1998 and 2002, the calculated ratio of the benefits to gas customers to total GRI costs incurred during the same period was 8 to 1<sup>2</sup>.

### **Conclusions**

GRI's planning and budget allocation process strives to put in place a program with the maximum ratio of benefits to RD&D costs for the mutual benefit of the gas customer and the gas industry. The economic evaluation of GRI's commercially successful RD&D results have consistently shown that benefits far exceed the costs of the RD&D program.

Analysis of the benefits of approximately 81 of the 133 GRI RD&D items placed in commercial service between January 1999 and December 2003 shows that GRI RD&D will return about \$8.0 for every dollar invested in GRI during the same period. In addition to the fact that only a portion of GRI's commercialized

<sup>2</sup> A.D. Bournakis, " Benefits of GRI RD&D Results That Have Been Placed in Commercial Use in 1998 Through 2002," Gas Research Institute, May 2003, GRI-03/0106.

RD&D items are included in the benefits calculation, all of the costs of GRI's operations during the 1999 to 2003 period have been included in the calculation of the benefit-to-cost ratio.

## Appendix A

### GRI RD&D Results That Have Been Placed in Commercial Use in 2003

#### RESIDENTIAL

**Upgrades to the National Fuel Gas Code:** GRI research led to recommendations for the 2002 National Fuel Gas Code (NFGC), published by the National Fire Protection Association in 2003, relating to the requirements for combustion air supply and corrugated gas vent connectors. These recommendations were intended to improve installation practices and energy efficiency. GRI's recommendations for appliance air requirements were to: 1) remove the designation of "unusually tight construction," because all new homes have what was previously considered unusually tight construction; 2) increase the required volume of rooms containing natural-draft gas appliances from at least 50 cubic feet per thousand Btu per hour of gas input to at least 52.5; and 3) specify a required volume of at least 37.5 cubic feet per thousand Btu per hour of gas input for rooms containing fan-vented appliances. GRI's recommendations for corrugated vent connectors were: 1) corrugated connectors to be equivalent to normal vent connectors and should both be oversized and have long-radius bends; 2) oversized corrugated connectors should be designed to avoid sudden expansions or contractions at the connections; and 3) flexible chimney reliners should have a design capacity 15% less than comparable Type B gas vents. The adoption of GRI's recommendations will allow greater flexibility in placing appliances in homes and will help reduce construction costs. Many installations that formerly required outdoor air to be ducted to the appliance will no longer require that expensive ducting.

#### COMMERCIAL

**Building Energy Analyzer™:** The Building Energy Analyzer™, developed by GRI, is a software tool that aids heating, ventilation, and air-conditioning (HVAC) professionals in tailoring economic analyses for several types of facilities. The program allows users to estimate critical information such as annual or monthly loads and costs associated with air-conditioning, heating, and on-site power generation for commercial buildings. The Building Energy Analyzer compares the performance of a wide variety of HVAC technologies, such as standard- and high-efficiency electric chillers, variable-speed electric chillers, absorption chillers, engine-driven chillers, on-site power generators, thermal storage, heat recovery, and desiccant systems. It estimates annual or monthly loads and costs associated with air-conditioning, heating, power generation, thermal storage and cogeneration systems for a given building and location. It performs quick-to-use economic analysis for the customer's utility rates, location, and building type. Additional features include: templates for each of the 15 most typical commercial building types; capability to handle complex utility rates; weather data for 233 cities; ability to perform life-cycle cost analysis on building cooling, heating, and power generation (BCHP) equipment. The software program is compatible with Windows® 95, 98, 2000, and XP and ME systems. Version 2.0 of BEA was released in 2003. The program with a complete manual in PDF format is distributed by GTI, with user support, maintenance, and upgrades provided through GTI's InterEnergy Software Project.

#### INDUSTRIAL

**\* Low-NO<sub>x</sub> Combustion System for Glass Furnaces:** Regenerative glass furnaces use extremely high air-preheat temperatures, which result in very high uncontrolled emissions of NO<sub>x</sub>. These furnaces are being placed under stringent regional and state regulations. GRI developed a furnace system that cost-effectively reduce NO<sub>x</sub> emissions from regenerative glass melters to less than 2.5 pounds per ton of glass. The new combustion technology, called oxygen-enriched air staging (OEAS), uses a unique method of introducing combustion air to control NO<sub>x</sub> formation. In a first combustion stage, the amount of combustion air through the firing ports is limited to decrease the oxygen available in the flame's high-temperature zone. This reduces NO<sub>x</sub> formation but leads to high concentrations of carbon monoxide and unburned hydrocarbons. Oxygen-enriched air is injected into the furnace in a second stage near the exit ports to complete the combustion. OEAS has been successfully retrofitted to endport container-glass



furnaces with flint and amber glass production capacities of 135 to 320 tons per day. NO<sub>x</sub> levels were reduced by 50-70%. The OEAS technology has now been adapted to operate similarly on sideport furnaces, which are used for nearly 65% of U.S. glass production. Endport and sideport furnaces are similar in concept, but significantly different in physical design and flame characteristics. OEAS has been successfully retrofitted to seven endport container-glass furnaces and three sideport container-glass furnaces. NO<sub>x</sub> was reduced by 50 to 70% on endport furnaces, with no adverse impacts on other emissions, furnace performance, or glass quality. OEAS technology applied to three sideport furnaces reduced NO<sub>x</sub> by 40% to as much as 70%. GRI licensed OEAS technology to Combustion Tec, the glass division of Eclipse Combustion. In 2003, Combustion Tec began marketing OEAS for endport and sideport glass furnaces.

**Low-NO<sub>x</sub>, High-Heat-Transfer Burner:** Two serious problems with high-temperature combustion processes, such as glass melting, are their intrinsically low efficiency and high emissions of NO<sub>x</sub>. Efficiency is low because of the high energy content of the combustion products leaving the process. NO<sub>x</sub> emissions are high because NO<sub>x</sub> yield increases as combustion temperature increases. The use of recuperative heat exchangers to increase efficiency and the use of post-process NO<sub>x</sub> emissions control equipment are costly solutions to the problems. Both problems could be mitigated by using oxygen instead of air to support the combustion. However, although oxy-gas firing has been implemented commercially to some extent, oxy-gas flames emit less thermal radiation than is desired for high process productivity. GRI developed a new oxy-gas burner that increases flame radiation by forming soot in the flame and then consuming the soot before it leaves the furnace. The High-Luminosity burner provides a preheating zone at the burner inlet to form soot, a fuel-rich flame zone to radiate heat to the furnace load, and a fuel-lean zone to burn out the soot. The soot radiation increases the effectiveness of heat transfer within the furnace and cools the flame, thereby reducing NO<sub>x</sub> formation. The new burner provides significantly higher heat transfer to furnace loads, higher furnace efficiency, lower flame temperature, lower combustion products exit temperature, and significantly lower NO<sub>x</sub> emissions. The high-luminosity burner can be used in conjunction with other NO<sub>x</sub> reduction techniques, including combustion modifications and oxygen-enriched air staging. The burner is an easily installed, low-cost process modification that can, in oxy-fuel applications, increase process and energy efficiency by up to 10 percent while emitting 50 percent less NO<sub>x</sub> than conventional oxy-gas burners. Test results showed a 4.5 percent increase in total heat transfer, which corresponds to a 10 percent decrease in fuel use. Combustion Tec Division of Eclipse™, Inc. licensed the technology and began marketing the burner to the glass industry in 2003 under the brand name Primefire® 400.

**LNG Interchangeability in Burners:** GRI evaluated the sensitivity of selected burners to compositions typical of LNG that is rich in heavier hydrocarbons. With LNG poised to play an increasingly important role in U.S. natural gas supplies, one of the issues of interest to the gas industry is the degree to which natural gas from LNG is interchangeable with pipeline quality gas in terms of its performance in combustion equipment, especially if heavier hydrocarbon components become more concentrated during handling. The heavier hydrocarbons would increase the density, heating value, and flame speed of the gas. If these increases are large enough, they may adversely affect the performance of some gas burners. The selected burners represent a variety of U.S. residential appliances. This study replicated previous methods that were used to study interchangeability to demonstrate their applicability to LNG, identified a set of indices that can be used to predict combustion behavior, investigated several ways to reduce the heating value of LNG, and related the performance of a specially designed test burner to the performance of a variety of residential appliances. The R&D determined interchangeability indices for natural gases used in the U.S. and for a range of anticipated world LNG imports to the U.S. It determined that, for the residential burners studied, expected LNG compositions are adequately interchangeable with U.S. pipeline gases if their heating value and density are suitably adjusted by dilution with air or nitrogen.

## **POWER GENERATION**

**Distributed Generation Switchgear:** GRI developed paralleling switchgear for distributed generation (DG) systems that offer lower capital costs; plug-and-play simplicity; integration with leading natural gas engine-generator set manufacturers; conformity with basic electric utility interconnection requirements; conformity with existing or projected industry standards; and remote monitoring, communications, and control functions. Consolidating system functions reduced the number of components, and this reduction in components led to a smaller footprint, lower material costs, and less engineering. In addition to cost reduction, the new switchgear has more features, and this makes gas-fueled DG systems more attractive. The switchgear offers the widest array of communication capabilities found in DG systems today. The cost of switchgear was reduced from \$75-\$100 per kilowatt to \$40-\$60 per kilowatt. This was accomplished by reducing the number of components in the generator control section by 40-60%, reducing the space required for mounting the generator controls by 50%, reducing the engineering time by 30%, and reducing sheet metal and bus bar by 40-70%. The results of this R&D have significantly reduced the barriers to installing gas-fired DG equipment. The switchgear became commercially available from GE Zenith Controls in 2003 under the name Entellogy®.

**Guidebook to Gas-Fired Distributed Energy Technologies:** There has been an increase in interest in on-site generation of electric power systems, also known as distributed energy (DE) systems. DE systems that recover and use exhaust heat from the engines to provide other thermal needs at the site are called cogeneration systems or combined heat and power (CHP) systems. CHP systems offer users high energy efficiency (up to 80%) because they make heat available that would be wasted if the electric power were generated at a central power station. Although DE and CHP systems offer very high energy efficiencies, they have not had high market penetration. Potential DE and CHP users are not familiar with DE and CHP equipment performance and cost. To help overcome the lack of familiarity, GRI cooperated with the National Renewable Energy Laboratory (NREL) to publish a definitive guidebook on the performance and cost of the various prime mover technologies that can be used to generate power in DE and CHP applications. These technologies are reciprocating engines, small gas turbines, microturbines, steam turbines, fuel cells, and Stirling engines. The guide was published in 2003 and is available from NREL. It describes each of the six technologies, their power generation performance, cost, and emissions characteristics. Because some of the technologies have not yet been fully commercialized, the guide also predicts the performance and cost that the prime mover technologies will achieve in the future (2010, 2020, and 2030).

## **DISTRIBUTION**

**Safety of Vacuum Excavation Operations:** Vacuum excavation involves the use of equipment to remove soil from holes that are being dug by distribution companies. Interest in using it has expanded greatly with the introduction of keyhole repair technologies, which depend on vacuum excavation. Keyhole repairs often encounter leaking gas in small spaces, and this has raised the question of whether vacuum excavation will pose unexpected hazards from ignition of gas-air mixtures in the vacuum hoses or the soil collection tank. Vacuum hoses are often made of plastic materials that are inexpensive and lightweight. Flow of air and solids through plastic pipes can create static electricity, which could be an ignition source. Flying rocks hitting the steel wall of the soil collection tank could also create sparks. GRI performed experiments designed with the deliberate goal of causing ignition. The experiments demonstrated that both high static electricity voltages and flammable gas-air mixtures can co-exist in the hoses and soil collection tanks without ignition occurring. A report, GRI-03/0128, "Vacuum Excavation of Potentially Flammable Gases," was released in September 2003. It gives gas companies confidence that vacuum excavation can be accomplished at least as safely as more traditional mechanical excavation. It is impossible to prove that ignition cannot occur under any condition that may occur during vacuum excavation. If gas company supervisors believe that there is an unacceptably high likelihood of gas ignition during a specific vacuum excavation operation, they can use aluminum-coated or other highly conductive vacuum hoses and ground both the soil collection tank and the hose. Small amounts of water

can also be used to prevent static charge accumulation. The report also contains recommendations for maintaining safety during the use of suction techniques to remove water from flooded gas mains.

**Gas Distribution Construction Guide:** To help LDCs appropriately adopt new construction and repair technologies, GRI developed a Web site that describes many commercially available technologies that have been developed. It is called the Utility Construction Methods Selection Guide. The site covers many trenching and boring technologies for replacing deteriorating gas pipes, pipe lining technologies for pipe rehabilitation without replacement, and pipe bursting and splitting technologies for situations where lining is not feasible. In general, for each technology, the Guide contains the following sections: introduction, general description, advantages, limitations, technical application data, special considerations, application trends, U.S. utility experience, and contact information. The Guide describes six case studies in which trenchless or “no-dig” methods have been used for rehabilitating or replacing old and deteriorating gas mains and service lines. The six case studies cover the following six technologies: Amex® 2000, horizontal directional drilling, RENU™, starline®, Swagelining™, and U-Liner. Information on each case study is organized into the following sections: introduction, method applied, participating utility, application location, technical data, cost and savings data, economic analysis, and contact information. The Web site also contains an on-line economic calculator that compares various utility construction methods. Based on user inputs, the calculator selects appropriate rehabilitation or replacement methods for comparison. The analysis of the selected methods includes total installed cost, annual cost over the life of the project, net present value, and life-cycle cost. The Web site was put into operation in 2003 at [www.gtiservices.org](http://www.gtiservices.org).

**Removing Cyanide Wastes from MGP Sites:** Cyanide compounds are found in the groundwater at many former manufactured gas plant (MGP) sites in the U.S. The cyanide compounds are residues of the manufactured gas purification process, which used iron-impregnated solid materials, such as wood chips, in purifier boxes to remove hydrogen sulfide from the manufactured gas. The iron compounds in the purifier box also removed some cyanide from the product gas. Spent iron compounds were often regenerated by spreading them on the ground. Some of the iron compounds remained in the soil and, upon contact with water, released cyanide compounds, which later entered the groundwater. Previous studies indicate that the dominant forms of cyanide compounds in purifier box wastes are iron cyanide complexes, which are highly stable in groundwater and resist natural decontamination by microorganisms. Current stringent limitations on allowable concentrations of cyanide in groundwater pose a compliance challenge. GRI evaluated alternate methods for removing iron cyanide complexes from the treatment plant effluent. The evaluation found that certain anion-exchange resins would adsorb the cyanide complexes, with a sorption capacity of up to 10% iron cyanide by weight. The resin functioned in the presence of high concentrations of sulfate ions, which interfere with the operation of most ion-exchange resins. GRI then developed a process based on the anion-exchange resins. The process was successfully demonstrated, at full scale, in an MGP waste treatment plant. It is recommended for treatment of water that contains up to 10,000 ppb of cyanide compounds. US Filter, in cooperation with GTI, is offering the process commercially.

**Chemical Fingerprinting for Enhanced Environmental Forensic Analysis:** Environmental forensic techniques are increasingly used to identify specific wastes, particularly at former MGP sites. However, currently, available analytical methods of environmental forensic techniques do not have enough conclusive discriminating power to insure scientific accuracy, reproducibility, and overall confidence in the use of chemical fingerprinting to characterize complex MGP wastes. These wastes, primarily dense non-aqueous phase liquid tars consisting of polynuclear aromatic hydrocarbon (PAH) compounds, are often aged, exceptionally dense, commingled with other wastes, and subjected to weathering over extended periods of time. With GRI support, the Gas Technology Institute has used chemical fingerprinting to successfully discern tar wastes from wholly different sources, and even to distinguish manufactured gas plant wastes from different plant operations. As a service to utility companies and

others, GTI is providing fingerprinting, forensic engineering, and technical support for the identification of pollutants at particular sites, as well as for the study of process mechanisms. GTI takes a two-tiered approach in its environmental forensic services: The first is to characterize the discrete organic pollutants (e.g., BTEX, PAHs, PCBs, and endocrine-disrupting compounds) in water, soil, or sediment samples. These organic compounds all possess distinct “chemical fingerprints” which often can provide sufficient information to determine the origin(s) or source(s) of the contamination. The second tier is to characterize or “chemically fingerprint” the complex macromolecular organic matter in the sample matrix itself for signatures of various sources (e.g., natural, agricultural, industrial, and anthropogenic). Specifically, natural organic matter (NOM) is characterized for water samples, soil organic matter (SOM) is characterized for soil samples, and sediment organic matter (SdOM) is characterized for sediment samples. This technique has proven to be a sufficient monitoring tool that quantitatively compares changes in the organic quality of NOM/SOM/SdOM due to seasonal influence, changes in inputs or discharges, as well as treatment. Furthermore, the chemical fragments that are the reflection of these influences can be identified, quantified, and compared with other chemical and biological data to establish relationships.

## **PIPELINE**

**\* Gas Leak Measurement Device (Hi-Flow® Sampler):** GRI has developed an improved version of the Hi-Flow® Sampler, an inexpensive instrument for field measurement of leak rates. The Hi-Flow Sampler can be used to measure the rate of gas leakage around various pipe fittings, valve packings, and compressor seals in natural gas transmission, storage, and compressor facilities. It also measures background methane concentration in the air and automatically corrects the leak rate measurement for this background methane. The instrument is based on straightforward principles of dynamic dilution and concentration measurement. A very large, measured flow of air sweeps the area of the leak, completely capturing any gas leaking from the component being tested. The rate of the gas leak is calculated from the concentration of methane in the sweep air. The instrument is intrinsically safe for use in Class I hazardous locations. It has been approved by the Canadian Standards Association (C22.2 No. 157, June 1992), American National Standards Institute (June 27, 2002), and Underwriters Laboratories (UL913-2002). It provides data logging and instantaneous leak-rate display, and only minimal operator training is needed. In 2003, Bacharach®, Inc. began marketing the Hi-Flow Sampler.

**Environmental Effects of Pipeline Crossings of Streams:** Regulatory agencies have expressed concern about the environmental impact of pipeline water crossing construction on stream and river ecosystems. The main issue is the entrainment of sediment during pipeline construction and the effects of the sediment on downstream aquatic organisms. Because there were limited data and no field-proven predictive tools to quantify the effects of sediment released during water-crossing construction, assessment of impacts has been based on professional judgment and consideration of worst-case scenarios. This has led to the use of construction methods that were unnecessarily costly and often did not actually improve the degree of environmental protection. Because of the large number of pipeline water crossings and the large differences in cost among crossing methods, there was a need for scientifically defensible planning tools that allow industry to construct cost-effective, environmentally acceptable watercourse crossings. To meet this need, GRI developed CROSSING™ software and released it in 1998. It estimates how much the release of sediment during in-stream construction affects downstream fish communities. In 2003, CROSSING™ version 2.0, a more robust software package, was released. CROSSING™ 2.0 helps gas companies and regulators evaluate potential adverse effects of water crossing construction. This enables the selection of least-cost construction methods that satisfy environmental goals. Gas consumers will benefit from lower cost of pipeline service and from the prompt availability of pipeline service without delays in construction caused by unnecessarily extended permitting procedures.

**Standard for Coriolis Meters:** As part of its continuing search for better gas meters, the gas industry has become interested in using Coriolis meters in certain applications. Coriolis meters are of interest because

they measure mass flow rate, which can be converted to a “standard” gas flow rate with only knowledge of the density of the gas at reference conditions. This is important because it avoids the need to predict the density of high-pressure gases with an equation of state and would avoid the errors associated with that prediction. Because of the mechanics involved in these meters, they are typically limited in size to pipe diameters less than 6 inches. Therefore, they would not be used for mainline meters, but would be used to measure gas flow to large customers or small municipalities. Manufacturers developed Coriolis meters for gas applications and reported the results of their development efforts, but no comprehensive, independent tests results were published. GRI evaluated the suitability of these meters for gas flow measurement, based on a test plan developed under the auspices of the American Gas Association. The tests verified that some of the meters that have been developed are accurate enough for gas custody transfer measurement. The results were incorporated into an American Gas Association report, issued in 2003. This report will serve as a standard for the gas industry. It provides a performance-based specification and test methods for Coriolis meters intended for natural gas flow measurement. It contains several appendices addressing theory, operation, accuracy, research, and test data.

## **EXPLORATION AND PRODUCTION**

**Cement Pulsation Technology:** Cement is used to seal the annulus between gas well casings and surrounding rock, to insure that gas flows are taken from the intended formation, that the gas does not leak into shallower (lower pressure) formations, and that the gas is not contaminated with flows from other formations. It has been estimated that the cement in 20% of cemented wells on land fail within the first five years and as many as 65% of offshore wells fail within 15 years. Without remediation, the well may not reach its full gas production potential, and the annular leakage may present safety issues. GRI found that the quality of the cement structure can be improved significantly by vibrating the cement with pressure pulses transmitted from the surface immediately after cementing. Applying the pulses from the surface is less costly than the chemical additives that are now used to help reduce the occurrence of cement integrity problems. This low-cost technology will improve the ability of well cementing operations to seal gas zones. It will improve cement quality and decrease well repair costs. The pulsing technique was tested in 150 wells in gas fields that have been prone to gas leakage through the cement. An estimated \$2 million in cement remediation costs was avoided. GRI’s research included modeling to understand gas migration in cement and to study pulse propagation, technique effectiveness, and cement quality. In 2003 the technique was made commercially available in the U.S. by Reservoir Isolation Technical Services (RITS).

**Analysis for Radium in Marine Sediments:** Environmental concerns arose in regulatory agencies over the possible presence of naturally occurring radioactive materials in natural gas. Nuclear reactions of naturally occurring uranium and thorium in the rock of producing formations can form radium isotopes such as radium-226 and radium-228, which have long half-lives. In addition to long half-lives, these isotopes have long biological residence times because they incorporate into living skeletal material. They present health risks to gas industry workers because they may be deposited in gas processing equipment. To enable accurate assessment of possible risks, GRI investigated methods for determining the concentrations of these radium isotopes in produced water, fish, and sediments. The goal was to identify a reliable analysis method for measuring concentrations as low as 0.01 picoCuries per gram of material. Based on this information a method for inter-laboratory tests was developed. It was found that commercial radiochemical laboratories could obtain reliably accurate results with this method. In addition, a new, analytical method for seawater was evaluated and found to be accurate and sensitive to less than 0.01 picoCuries per gram. A report, GRI/01-0244, “Development, Evaluation, and Validation of Radioanalytical Methods for the Measurement of Radium 226 and 228 in Environmental Media Relevant to the Offshore Oil and Gas Industry,” was made available in 2003 to gas production companies and service laboratories. The research results will help gas companies focus their remediation and control efforts on sites that pose true risks. This will enhance worker safety and reduce the overall cost of gas production.

**Produced Water Atlases and Handbook:** Changing environmental regulations and subsequent changes in permitting processes for produced water disposal are obliging oil and gas producers to modify their water treatment and disposal practices, often incurring higher costs. Surface discharge, which is the most economical strategy for produced water disposal, is no longer a viable option in many states where regulations have increasingly restricted the quality and quantity of water that can be disposed in that manner. When surface disposal is not a choice, beneficial use of recycled water becomes a favorable option. GRI compiled data to characterize the amount of water produced, production trends, and pertinent environmental regulations and analyzed localized produced water management strategies and costs. Annual oil, gas, and water production volumes were documented for key fields in each of the oil and gas basins in ten states. Producers reporting high volumes of water coupled with high hydrocarbon production were identified and interviewed to obtain specific information about their strategies for managing or disposing of produced water and the costs associated with those strategies. The data are contained in ten atlases, one for each of the following major gas-producing states: Wyoming, Colorado, Utah, New Mexico, Montana, Kansas, Oklahoma, Illinois, Michigan, and Louisiana. The research also produced a handbook that is a resource for gas producers and provides them with actual produced water management practices and disposal economics for 26 basins in ten states. The handbook also describes technologies that are used to treat or handle produced water. GRI published the atlases on a single compact disc in 2003. The Handbook is a separate GRI publication, also published in 2003.

**Gas Resource and Production Potential of the Lewis Shale:** The Lewis shale formation of the San Juan Basin in Colorado and New Mexico has an enormous gas-in-place volume. The properties of the reservoir and the mechanisms that control gas production from this formation are not well understood. GRI conducted formation evaluation research to quantify the gas-in-place volume stored by sorption, compression, and solution mechanisms; the depths of the most permeable rock; and the production mechanisms. The research collected and interpreted new data that were needed to improve the analysis of the wireline log data that are used to quantify the amount of gas in place and to determine the zones of greatest gas deliverability within the Lewis Shale. The research determined in situ gas permeabilities and estimated the amount of gas in place and how much of it should be recoverable. Shale gas reservoirs extend throughout the Western Cretaceous Basins from New Mexico to Canada. The amount of gas in place documented for the San Juan Basin are likely to be present in at least eight western basins. The formation evaluation approach implemented and documented during this research is applicable to all of these basins. The results of the research were published in a comprehensive report in 2003, GRI-03/0037, Final Report: "Lewis Shale Gas Resource and Production Potential". The information will help E&P companies understand this unconventional resource and will serve as a starting point for applying improved reservoir characterization technology to the development of the Lewis and other shale gas reservoirs. The enhanced understanding will lead to lower exploration costs and increased production of natural gas from shale formations.

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\* Enhancement to a previous product.

## **Appendix B**

### **GRI RD&D Results That Have Been Placed in Commercial Use in 1999 Through 2003**

#### **RESIDENTIAL**

1. Combo Systems Sizing and Installation Guidelines – 1992/2000
2. NAECA Water Heater Assessment - 2000
3. Indoor Emissions from Cooking – 2001
4. Summary Report of GRI's Venting Research - 2002
5. Gas Venting Safety Assessment - 2002
6. Accurate Assessment of Heat Pump Efficiency – 2002
7. Upgrades to the National Fuel Gas Code - 2003

#### **COMMERCIAL**

8. GATC Quick Response Activities – 1995/1999  
(Life-Cycle Cost Model for Food Service Technologies)
9. BinMaker™ Pro: The Weather Summary Tool – 1997/2000
10. kitchenCOST™ Software- 1998/99
11. Modulating Indirect-Fired Make-Up Air Unit - 1999
12. GATC: AERCO Benchmark Boiler - 1999
13. Engine Rooftop Heat Pump (Goettl 15-20 ton) - 1999
14. PITCO Gas Fryers - 1999
15. AUTOFRY™ Deep Fat Fryer - 1999
16. Analysis of Commercial Sizing and Installation Guidelines - 2000
17. Gas Cooling Guide – Pro Version - 2000
18. York 600 RT 134a Chiller - 2000
19. Tecogen 150 RT 134a Chiller - 2000
20. Trane Single Effect Horizon Chiller - 2000
21. Chiller Application Briefs - 2000
22. Restaurant Kiosk Ventilation and High-Performance Gas Countertop – 2000
23. Comparison of Radiant and Convective Unit Heaters - 2002
24. Gas-Fired Commercial Steam Cooker – 2002
25. Building Energy Analyzer™ - 2003

#### **INDUSTRIAL**

26. Process Application of Composite Radiant Tubes (and Case Studies) and Advanced U-Shaped Radiant Tubes - 1994/99/2002
27. Low-NO<sub>x</sub> Air Staging for Glass Melting/Low-NO<sub>x</sub> Combustion System for Glass Furnaces 1995/2003
28. Industrial Boiler Gas Cofiring (including Biomass) - 1995/99
29. High Performance Infrared Burners (and Application Tools) – 1995/99
30. METHANE de-NOX® Controls for Stoker Boilers - 1999
31. Ultra-Low-NO<sub>x</sub> Burner for Boiler Retrofit - 1999
32. Forced Convection Heater (FCH) Systems – Automotive – 2000
33. Oscillating Combustion Burner - 2001

- 34. Radiant Heater Characterization Facility - 2001
- 35. Low-NO<sub>x</sub> Retrofit Burners for Fire-Tube Boilers – 2002
- 36. Low-Cost Multi-Gas Continuous Emissions Monitor – 2002
- 37. Low-NO<sub>x</sub>, High-Heat-Transfer Burner 2003
- 38. LNG Interchangeability in Burners - 2003

## **POWER GENERATION**

- 39. DGen Pro™ Software – 1998/99/2000
- 40. SOAPP™ Modules – 1998/99
- 41. Microturbines (Capstone and Honeywell) - 1999
- 42. Distributed Generation Guidebook for Municipal Utilities - 1999
- 43. IR PowerWorks Microturbine Cogeneration Systems – 2000
- 44. Advanced High-Output Gas Engine-Generator (Caterpillar 3500® Series) – 2001
- 45. Distributed Generation Switchgear – 2003
- 46. Guidebook to Gas-Fired Distributed Energy Technologies - 2003

## **TRANSPORTATION**

- 47. Cummins C8.3G Engine – 1996/2001
- 48. John Deere 8.1L Engine – 1996/99/2002
- 49. MACK E7G Refuse Hauler – 1996/2002
- 50. John Deere 6.8L – 1998/99
- 51. NGV Cylinders (Types 1 and 2) - 1999
- 52. Glass-Fiber-Wrapped Fuel Tanks for NGVs - 2000
- 53. Advanced NGV Fueling Dispenser
- 54. Best Practices for Medium-and Heavy-Duty NGV Fuel System Design - 2002
- 55. Clean Cities Initiative to Evaluate NGV Technology - 2002
- 56. Resource Guide for Heavy-Duty LNG Vehicles - 2002
- 57. Regional Natural Gas Vehicle Fueling Infrastructure Standards - 2002

## **DISTRIBUTION**

- 58. PE LIFESPAN FORECASTING™ – 1994/2001
- 59. Plastic Pipe Across Bridges – 1995/99
- 60. DrillPath™ Guided Boring Software – 1996/99
- 61. Pipe Splitting Tool - 1998/02
- 62. TUBIS™ Software for Repair/Replace Decisions - 1999
- 63. Pipe Ovality and Scratch Depth Measurement Device and Guidelines - 1999
- 64. Plastic Pipe Repair Techniques - 1999
- 65. Starline® 2000 Renewal Technology - 1999
- 66. Guided Mole - 1999
- 67. Gas Holder Manual of Practice - 1999
- 68. Precision Pipe Locator - 2000
- 69. One-Step Paving - 2000
- 70. Bare Steel Maintenance Optimization System (BASMOS) Software - 2000
- 71. Soil Compaction Supervisor - 2000



72. Self-Loading, High-Efficiency Trailer for Coiled PE Pipe - 2001
73. Cold-Mix Restoration of Pavement Cuts - 2001
74. Imaging Underground Utility Structures - 2001
75. Comparative Evaluation of PE Pipe Materials - 2001
76. Directional Drilling for Plastic Pipe under Railroad Crossings - 2001
77. Gas Distribution Cost Database - 2002
78. Effect of Bomb Blasts on Gas Distribution Equipment- 2002
79. Assessment of PVC Pipe - 2002
80. Effect of Utility Cuts on Pavement Quality - 2002
81. Plastic Pipe Informational Web Site - 2002
82. Evaluation of the Performance of Carbon Monoxide Alarms - 2002
83. Worker Exposure to Hazardous Substances – 2002
84. Safety of Vacuum Excavation Operations - 2003
85. Gas Distribution Construction Guide - 2003
86. Removing Cyanide Wastes from MGP Sites – 2003
87. Chemical Fingerprinting for Enhanced Environmental Forensic Analysis - 2003

## **PIPELINE**

88. Clock Spring® Composite Pipeline Repair Material – 1995/99
89. Risk Assessment/Risk Management Guidelines – 1996/99
90. Breeze Haz™ Environment and Safety Offsite Consequence Modeling Software - 1999
91. Emeritus Report B31.8 Code, Federal Pipeline Safety Regulations - 2000
92. Elastic Wave Vehicle Tool - 2000
93. Gas Leak Measurement Device (Hi-Flow® Sampler) – 2000/03
94. API 14.1 Gas Sampling Standard - 2001
95. Ultrasonic Meter Installation Effects -2001
96. Orifice Meter Operational Effects - 2001
97. Orifice Plate Installation Effects - 2001
98. Gas Storage Well Rehabilitation and Damage Prevention - DamageExpert™ Software -2001
99. Satellite Radar Interferometry Measurement of Slope Movement - 2001
100. AIRCalc™ Software – 2001
101. Predicting the Integrity of Storage Caverns in Thin Salt Beds - 2002
102. ASME Standard for Pipeline Integrity Management - 2002
103. NACE Standard for Direct Assessment of Pipeline Corrosion - 2002
104. Revegetation of Rights-of-Way in Wetlands - 2002
105. Reference Manuals of Best Practices for Horizontal Directional Drilling and its Effects in Wetlands - 2002
106. Best Environmental Practices for Pipeline Construction - 2002
107. Integrated Vegetation Management – 2002
108. Environmental Effects of Pipeline Crossings of Streams - 2003
109. Standard for Coriolis Meters - 2003

## **EXPLORATION AND PRODUCTION**

110. Glycol Dehydrator Emissions Calculation Program – GLYCalc™ - 1992/2000
111. Gas Composition Database – 1996/2001
112. Unconventional Natural Gas Database – 1999/2001

- 113.Nitrogen Removal Requirements Report - 1999
  - 114.Downhole Gas/Water Separation CD-ROM - 1999
  - 115.Advanced Crosswell Seismic Source - 1999
  - 116.High Power VSP Mechanical Seismic Source - 1999
  - 117.Advanced Stimulation Technologies CD-ROM - 1999
  - 118.Coiled Tubing Standards - 1999
  - 119.GRI-MSTR™ Software and Report to Predict Toxicity of Produced Water Discharged to the Marine Environment – 1999
  - 120.ProTreat™ Software for Amine Gas Treating Applications - 2000
  - 121.Cased Hole Resistivity Tool - 2000
  - 122.Cased Hole Pressure Tool - 2000
  - 123.Well Siting in Carbonates – EGI Report - 2000
  - 124.Portfolio of Emerging Natural Gas Resources – Rocky Mountain Basins - 2000
  - 125.Mercury Contamination Training Workshop – 2000
  - 126.New Gas Exploration Concepts - 2001
  - 127.StreamAnalyzer™ Software - 2001
  - 128.Enhanced Seismic Spectral Processor - 2002
  - 129.Evaluating Ecological Impacts at E&P Sites – 2002
  - 130.Cement Pulsation Technology - 2003
  - 131.Analysis for Radium in Marine Sediments - 2003
  - 132.Produced Water Atlases and Handbook - 2003
  - 133.Gas Resource and Production Potential of the Lewis Shales - 2003
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COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
SEVENTH SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

DTE-7-6      For each of the past 10 years, please provide supporting documentation demonstrating that the benefits to Bay State's customers derived from GTI research, have equaled or exceeded the Company's contribution towards such costs.

Response:    Bay State's only contribution to GTI research has been the ratepayer supported East Coast Distributor Funds described in DTE-7-1, which began in 1998 and ended in 2004. Attachment DTE-7-6 contains a listing of those projects of which Bay State and its customers have benefited from GTI research and/or new technology.

## Selected GTI-Funded Distribution Products and Technologies

Product Area	Product	Use Status	Annual Usage and Benefits
<b>Plastic Pipe Technology</b>	Electrofusion Joining Guidelines		<i>These have been incorporated into BAY STATE GAS's practices. It is a struggle to assign a specific value to them. There is a group within BAY STATE GAS that is looking at electrofusion equipment to use. The guidelines don't address equipment or manufacturer to use.</i>
	Squeeze-off Guidelines		<i>These have been incorporated into BAY STATE GAS's practices. As with other guidelines, it is a struggle to assign a specific value to them.</i>
	PE Life Prediction Program (PE LIFESPAN FORECASTING)		<i>BAY STATE GAS has the report and will check to see if anyone is using it.</i>
	Static Discharge Systems (Static Pro and Normac ASG System 3)		<i>This system is part of every storeroom and crews must use it. It is called for in the O&amp;M procedures in handling PE pipe. There is great risk of gas igniting because of static and the costs associated with personal injury are very great. The savings of this technology versus an alternative method fall within the national range of \$5,000 to \$10,000 annually.</i>
<b>No-Dig Technology</b>	Guided Boring Systems		<i>BAY STATE GAS contractors use this for mains and service installations that reduces the amount of soil disturbed but we have no hard numbers on savings though we do believe that this technology results in lower contractor bids.</i>
<b>Excavation &amp; Restoration</b>	Corrugated Stainless Steel Tubing (CSST)		Bay State uses this on a limited basis to tie back in customer piping during service replacements
	Shoring Guidelines		<i>BAY STATE GAS uses shoring guidelines to perform safe excavations but is unable to quantify benefits other than the expectation of fewer trench injuries.</i>

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## Appendix

### Product Descriptions

#### Electrofusion Joining Guidelines

The electrofusion joining guidelines, GTI Report number GRI-96/0128, were developed by GTI as a means for utilities to more effectively complete electrofusions. The benefits that these guidelines offer can be detected in the training of employees and the overall efficiency and effectiveness of the process. Additional benefits include avoided costs of repairing a faulty joint, fewer leaks, and fewer incidents. The report is available to all GTI members for free.

#### Squeeze-Off Guidelines

In order to repair or extend PE pipe, the pipe is usually “squeezed off” to stop the flow of gas. In general, squeezing off a PE pipe has proven to be a safe and effective practice; however, if the process is done incorrectly, it can cause cracks to slowly grow in a pipe which can eventually lead to pipe repairs. TI funded the development of recommended guidelines that define the correct way to squeeze off a pipe, thus reducing the chance of crack growth in the future. The squeeze-off guidelines and video are free.

**Benefits:** Several GTI member companies report savings of approximately \$5,000 to \$10,000 annually by using these guidelines. For a typical company:

- Avoidance of 1250\* leaks per year caused by squeeze-off:
- Excavation costs: \$1,000 per leak\*\*
- Damage claims against LDC: \$10,000 per leak\*\*\*

**Benefits Calculations:** Costs Avoided by Proper Squeeze-off Technique

- Annual Cost Savings: (100% credit) 1250 leaks x \$11,000 = \$13 million per year
- Assumed Number of Leaks caused by Squeeze-off per LDC: 5 leaks per year
- LDC Cost Savings:
  - Excavation costs savings: \$5,000 per year
  - Potential Claims cost savings: \$50,000 per year

**Annual LDC Savings: \$55K**

#### Static Electricity Discharge System

Because of the nature of polyethylene pipe, static electricity can build up on both the interior and exterior of the pipe. As a result, static electricity can cause damage to workers and/or property when work is being performed on or near the pipe. The static electricity discharge system, Normac, is designed to safely dissipate the static charge that can build up on the PE pipe. The system consists of a specially formulated antistatic fluid and PE film. The exposed pipe is sprayed with the fluid and then wrapped with the film. In just a few minutes, the ends of the film are then grounded to neutralize the charge. This product is available through Norton McMurray Manufacturing Company and R.W. Lyall and Company.

Using the static electricity discharge system could reduce the costs associated with injuries and/or damages that result when incidents occur. Although the system costs of \$75 for the rolls and spray are

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\* Based upon survey of 15 utilities having 30% of U.S. mains [Extrapolated to the entire industry].

\*\* \$1,000 cost avoided based upon Joyce Study commissioned by GRI: Claims amount based upon 15 utility survey.

\*\*\* Assumed. \$40k average claim indicated by legal database information.

more than conventional methods (“wet rag” methods), the system is recommended because it is safer than the alternatives. Nationally, there are approximately 10 incidents per year that are caused by static electricity with an average cost of \$567,700 per incident. Several GTI member companies estimate savings of approximately \$5,000 to \$10,000 per year.

Annual Savings	\$32,000
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**Annual LDC Savings: \$32K**

### **Guided Boring System**

Guided boring, available from such manufacturers as Ditch Witch and Vermeer, is a trenchless technology used to install and replace mains and services. With this technology, a crew can bore beneath pavements, riverbeds, and landscaped areas for utility installation—usually from a single, excavated entry point. By using guided boring, utilities reduce the cost of site restoration. Customers and the general public avoid the inconvenience associated with conventional trenching and plowing methods.

Because this technology minimizes restoration costs, companies could save significantly by using it. On average a utility can expect to save about \$13 per foot on applicable jobs by using guided boring instead of open trenching. Guided Boring technology is currently retailing for \$50,000 to \$75,000.

**Annual LDC Savings: \$750K (based on BAY STATE GAS analysis in 2000)**

### **Guided Impact Mole**

The guided impact mole is a steerable percussion mole. It is a trenchless guided piercing tool that can be used to install gas mains and services. The guided impact mole was developed as a technological alternative to the smaller, or “mini-rig,” guided boring systems. It is much more compact than conventional guided boring units, allowing transportation in a pickup truck rather than the one-ton trucks required by most conventional systems. In addition, the guided impact mole does not require extra equipment such as the power unit and the water tank that are necessary for use in conventional boring systems. Because it is a trenchless technology, the guided mole is particularly useful and cost-effective in developed areas and/or environmentally sensitive areas. In addition to the convenience the guided impact mole offers, it also has monetary advantages. Reduced excavation and restoration costs, as well as lower labor costs, are where the most significant savings can be realized. The guided impact mole requires only a two-person operation compared to the three-person operation that a conventional systems requires. One GTI member company reports savings of \$50,000 from the use of the guided impact mole prototype. The Guided Impact Mole is available from TT Technologies for approximately \$20,000 to \$25,000.

#### **Benefits Calculations:**

Cost of a 100-foot trenching job	\$4,000
Savings per trenching Job	\$1,500
Guided Mole Jobs per year	20
Annual Savings	\$30,000
Payback Period	1 year

**Annual LDC Savings: \$30K**

#### **Benefits Calculations:**

### **Distribution Renewal Systems**

Distribution renewal methods are designed to rehabilitate cast iron and bare steel mains and services with the intention to extend the usefulness of the distribution lines. There are two forms of renewal: modified sliplining and CIP pipes. Modified sliplining inserts a new plastic pipe into an existing pipe by temporarily reducing the diameter or deforming the new pipe, and then pulling it into the existing pipe. Cured-in-place (CIP) pipes utilize a flexible liner that is filled with an epoxy adhesive and then turned "inside-out" as it is inserted into the existing pipe. These methods can offer significant benefits in cases where rehabilitation and restoration of these types of pipes is necessary. The distribution renewal methods are trenchless, which means there is little or no trenching associated with the jobs.

Savings are estimated to be \$50 per foot for mains and \$30 per foot for services in urban areas.

#### **Benefits Calculations - Mains:**

Main Repair Length	1,000
Renewal Savings for Mains	\$50
Renewal Savings per Job	\$5,000
Service Jobs per year	5
Annual Savings for Distribution Services	\$50,000

#### **Benefits Calculations - Services:**

Average service length (Tom Joyce Associates study)	67
Renewal Savings for Services	\$30
Renewal Savings per Job	\$2,010
Service Jobs per year	50
Annual Savings for Distribution Services	\$100,500

**Annual LDC Savings: \$150.5K**

### **Corrugated Stainless Steel Tubing**

Corrugated stainless steel tubing (CSST) is a complete natural gas piping system that consists of flexible tubing, fittings, pressure regulators, and protective plates. CSST can be useful for installing gas services to multi-family units, as well as for relocating gas meters from the inside to the outside of single-family units. CSST can also reduce total installation costs for new customers since the flexible tubing requires less labor time and fewer fittings. CSST is available from Omega Flex Inc, Parker Hannifin Corp., Titeflex Corp, Tru-Flex Metal Hose Corp. and Ward Manufacturing.

GTI member companies have reported savings of \$0.60 to \$1.00 per foot by using CSST. These savings are representative of overall reduction in labor. CSST is a premium cost product, but many companies say it requires one-fourth of the time to install, thus resulting in significant cost savings.

#### **Benefits Calculations:**

	<b>1" CSST Pipe</b>	<b>1" Steel Pipe</b>
Average Pipe Run	10 to 35 feet	10 to 35 feet
Number of Fittings Needed	2	5
Average Material Cost	\$75	\$28
Average Labor Time	0.67 hours	2.75 hours
Average Labor Cost	\$25 per installation	\$103
Total Material and Labor Cost	\$100	\$131
Average Savings Using CSST	\$31	
Estimated Annual Meter	3,000	

Relocations using CSST		
Total Annual Savings from CSST	\$93,000	

**Annual LDC Savings: \$93K**

### **Shoring Guidelines**

The Occupational Health and Safety Administration (OSHA) requires worker protection and a safe working environment when excavations are being conducted. One way to provide this safety is through shoring systems. OSHA has defined several ways to comply with the requirement. One way is to use the guidelines designed by OSHA. Another is to use systems designed by professors. GTI funded Cornell University to develop shoring standards, GTI Report number GTI-96/0006, that comply with the OSHA guidelines. GTI has expanded on these guidelines by OSHA to allow utilities to reduce the shoring cost of materials due to a more accurate soil classification. Savings resulting from the use of these standards have yet to be determined.

### **Benefits Calculations:**

The new guidelines reduce the cost of operating and maintaining the existing gas distribution system. Estimated cost savings of about 50% over existing shoring procedures.

- Average cost per shore: \$1325
- Cost savings per shore due to guidelines: 14.6%
- Cost per shore, cost-savings to utilities from the low-cost shoring guidelines, and number of shores were estimated based on a survey of annual shored excavations and cost data from seven utilities representing 20.5% of gas customers.
- Assumed number of shoring jobs per Utility per year: 200

$\$1325 \text{ cost/shore} \times 14.6\% \text{ savings per job} \times 200 \text{ jobs/year} \times 50\% \text{ market penetration} = \$19,345$

**Annual LDC Savings: \$19K**



COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
SEVENTH SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Danny G. Cote, General Manager

DTE-7-7 Please provide support indicating that the expected benefits from GTI research will at a minimum equal contributions. In the response, please provide actual, measurable figures, not expected figures or unsupported testimony.

Response: Benefits to Bay State Gas' customers for the proposed projects will include reduced O&M costs, increased safety, and lower environmental compliance costs.

Specifically, the four Operations Technology Development (OTD) projects proposed are laser leak survey, crew truck productivity improvement, meter change-outs, and alternatives to pavement breaking. In addition to the benefits specified below, Bay State Gas will have access to the results of all OTD projects, as an OTD member.

Primary benefits of the laser leak survey project are cost reduction and increase in efficiency associated with both mobile and walking leak surveys. A major goal for the development of the Laser Line-scan Camera (LLC) is to minimize the need for most walking surveys. This technology will benefit MA ratepayers as Bay State Gas routinely performs a variety of leakage surveys as required under federal and state regulations.

Primary benefits of the crew truck productivity improvement project are increased productivity; reduced operating and maintenance costs as well as minimizing work related injuries and associated costs. These benefits will be realized by all participating utilities including Bay State Gas and their MA ratepayers.

Primary benefits of the meter change-out project includes the ability for Bay State gas to perform routine meter exchanges without the disruption of customer service, elimination of the appointment scheduling process, increasing efficiency and productivity of the work force, minimizing impact to customers and reducing O&M costs. This project has specific benefits to MA ratepayers as MA legislation dictates a seven-year meter change out timeline vs. 10 – 20 year programs common in many other states.

Primary benefits of the alternatives to pavement breaking project are

reduced crew number, time and cost of operation, enhance the safety of operators with less dust and crew fatigue, reduced associated noise, thus permitting night work in residential areas, improved customer relations due to quicker operations, increase the quality of cutting and reduced damage to adjacent pavement resulting in lower O&M costs.

For the environmental MGP fuels to byproducts project, benefits include reduced environmental compliance costs.

The nature of these research projects and others within the OTD and similar programs results in benefits such as cost avoidance and increased safety of both the general public and utility employees. These benefits are inherently difficult to quantify in financial terms on a looking forward basis. However, Bay State Gas and the natural gas industry at-large, have received and continue to receive significant cost savings from break-through technologies such as the utilization of polyethylene (PE) piping vs. steel distribution piping, the development of safe operating practices for PE pipe, the use of horizontal directional drilling equipment vs. open-cut trenching, the safe and efficient use of keyhole technology and vacuum excavation equipment, the development of cured-in-place lining systems for the rehabilitation of aging infrastructure and the development of optimal practices for soil compaction and pavement restoration. Bay State Gas believes the benefits derived from research and development moving forward will be similar to that previously experienced under the GRI RD&D Program. These benefits have been documented in the FERC-reviewed national benefits paper included as DTE 07-07 Attachment A in the report entitled "Benefits of GRI RD&D Results That Have Been Placed in Commercial Use in 1999 Through 2003, Prepared by: Athanasios D. Bournakis, Energy Resources Center University of Illinois at Chicago".

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
SECOND SET OF INFORMATION REQUESTS FROM THE MASS OILHEAT COUNCIL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Stephen H. Bryant, President

MOC-2-5      Please describe the Company's projected goals for its sales promotion activities as proposed in the filing.

Response:    The Company's projected goal for its sales promotion activities is to maximize the utilization of, and return on, its infrastructure.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
SECOND SET OF INFORMATION REQUESTS FROM THE MASS OILHEAT COUNCIL  
D. T. E. 05-27

Date: June 21, 2005

Responsible: Stephen H. Bryant, President

MOC-2-6      Please indicate whether the Company has conducted any quantitative review or study which demonstrates that the Company's sales promotion goals will not be achieved in an amount less than the Company's proposed promotion budget.

Response:      The Company has conducted no such quantitative review or study.